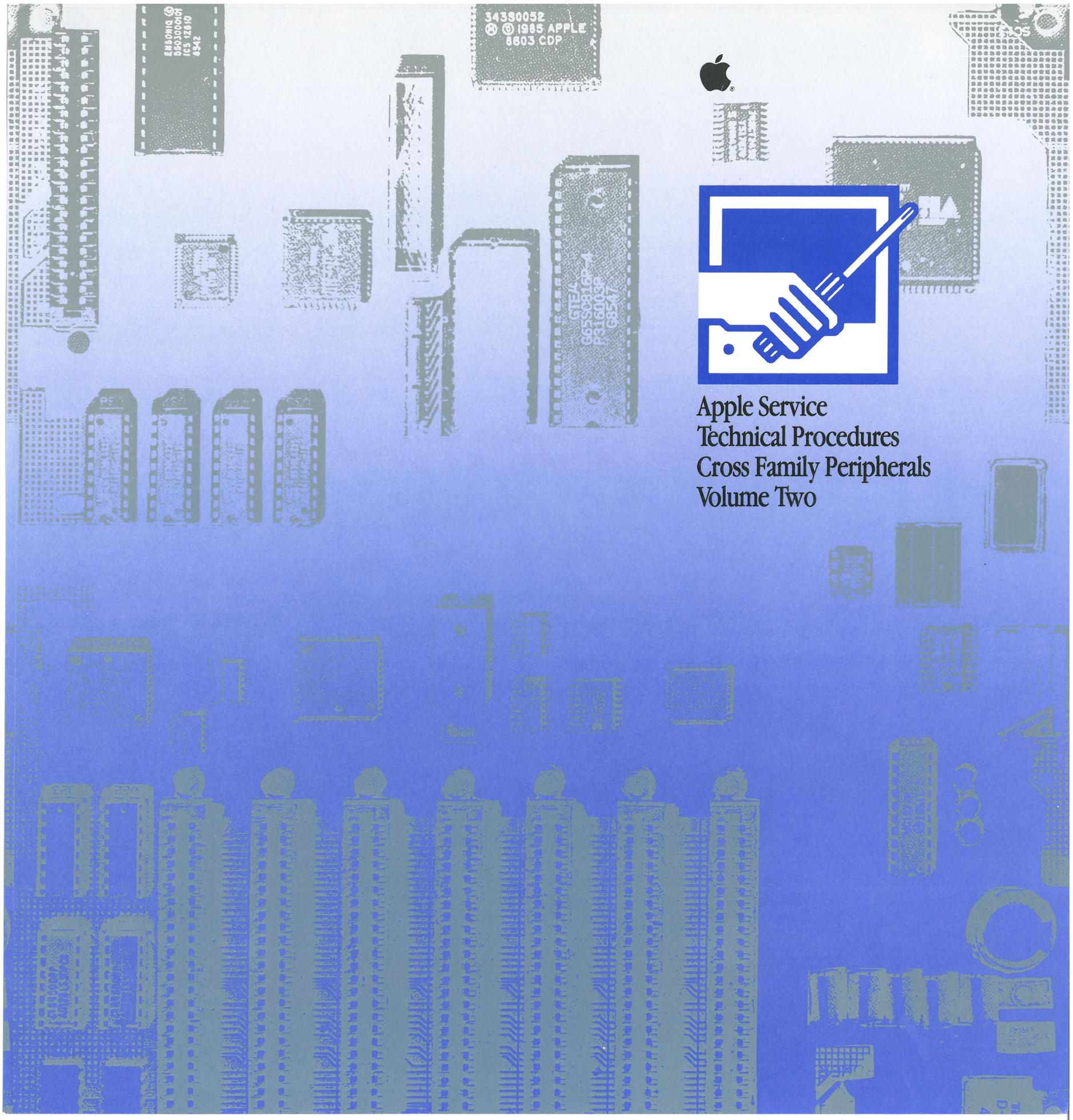

Apple Service Technical Procedures Cross Family Peripherals Volume Two

Apple Service Technical Procedures Cross Family Peripherals

Volume Two

PN: 072-0230
(Cross Family Not Sold Separately)

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Apple Technical Procedures

Cross Family Peripherals
Volume Two

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ImageWriter Technical Procedures

Section 1

Introduction

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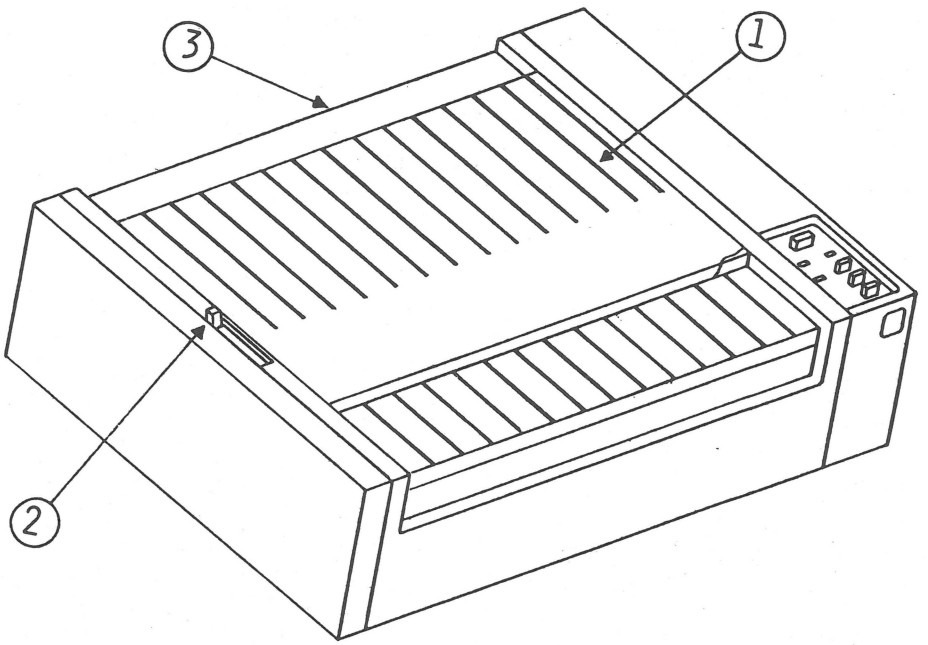


FIGURE 1

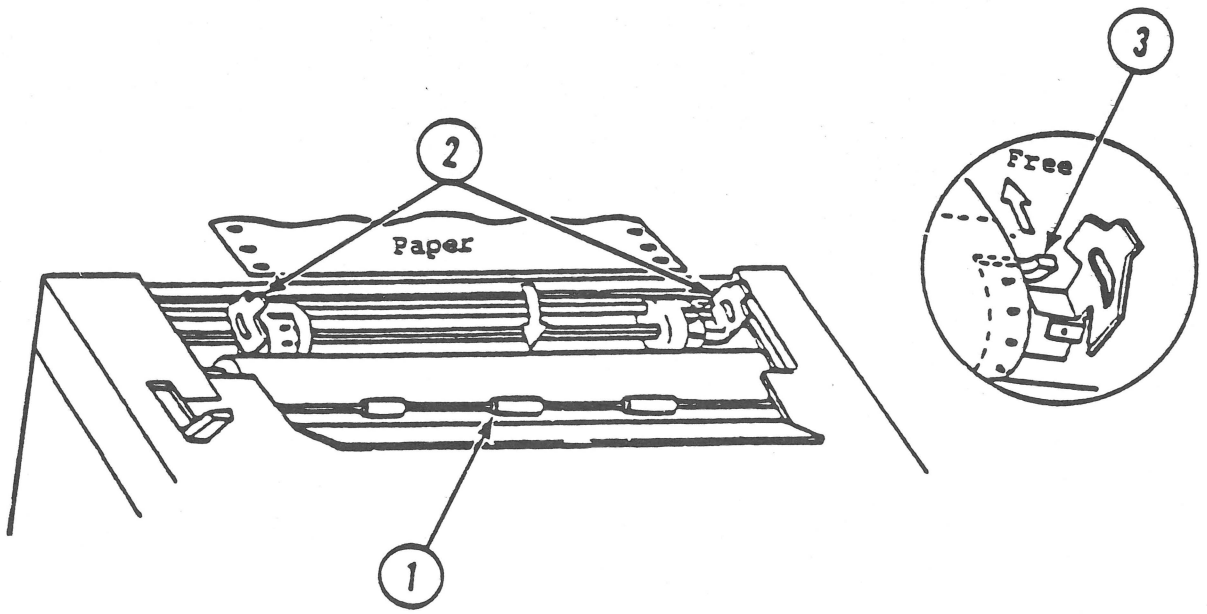


FIGURE 2

The ImageWriter is an improved version of the Dot Matrix Printer offering the following advantages:

- o faster printing speed for graphics and text
- o lower noise level
- o easier removal of switch panel, power switch, and covers
- o standard interface (serial instead of parallel)

The switch panel and power switch have been relocated and the case has been restyled, but the mechanical assembly and adjustments are the same as for the Dot Matrix Printer.

A. POWER ON AND OFF, LOAD AND REMOVE PAPER AND RIBBON CARTRIDGE, AND RUN SELF-TEST

Power On and Off

1. Connect the power cord to the printer.
2. Plug the power cord into an electrical outlet.
3. Press the power switch ON.
4. Check the switch panel. Make sure the POWER light comes on.
5. Press the power switch OFF.

Load Paper

1. Make sure the power is off.
2. Raise the print cover toward you (see Figure 1, #1).
3. Pull the paper release lever forward (see Figure 1, #2).
4. Lift up and remove the paper cover (see Figure 1, #3).
5. Pull the paper bail shaft forward (see Figure 2, #1).
6. Lift the covers up on the right and left tractor sprockets (see Figure 2, #2).
7. Make sure the left tractor is all the way over to the left. To move the tractor, push back the white lever (see Figure 2, #3). Move the tractor all the way over to the left. To lock the tractor in place, pull the white lever back toward you.

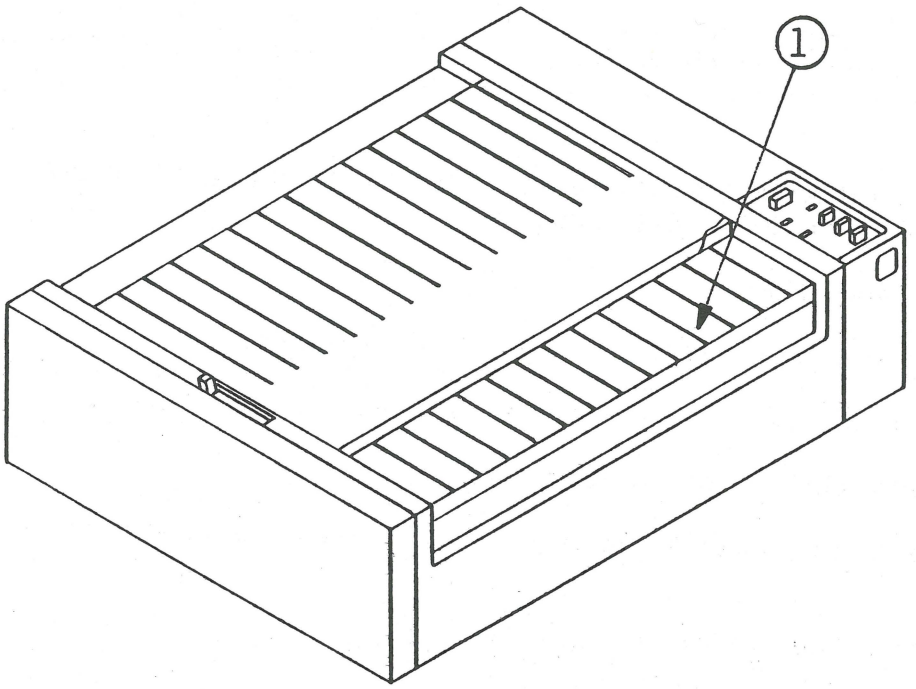


FIGURE 3

8. Place the paper over the sprockets tractor pins. If the paper doesn't line up with the sprockets, move the right tractor until it does.

9. Push down the covers on right and left tractor sprockets.

10. Turn the platen knob until the paper comes through.

11. Push back the paper bail shaft.

12. Push back the release lever.

13. Put the paper cover back on.

14. Push back the print cover.

15. Replace the paper cover.

Remove Paper

1. Make sure the power is off.

2. Pull the paper cover toward you.

3. Remove the paper cover.

4. Pull the release lever forward.

5. Turn the platen knob to back out the paper.

Remove Ribbon Cartridge

1. Make sure power is off.

2. Lift up and remove the carrier cover (see Figure 3, #1).

3. While pushing down on the cartridge latch arms, lift up the cartridge.

4. Replace the carrier cover.

NOTE: Be sure to replace the carrier cover before attempting to operate the printer. The printer will not print without the carrier cover in place.

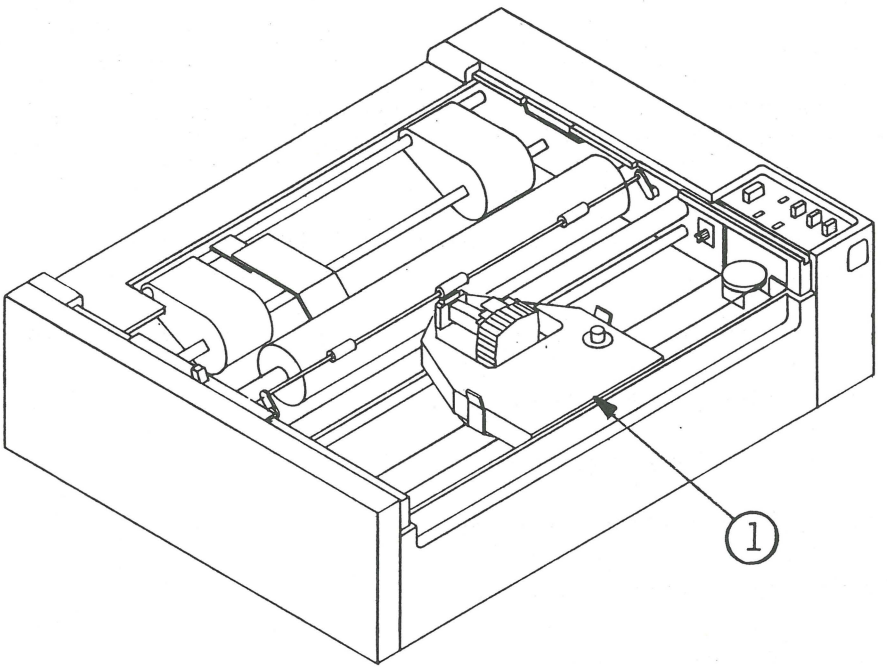


FIGURE 4

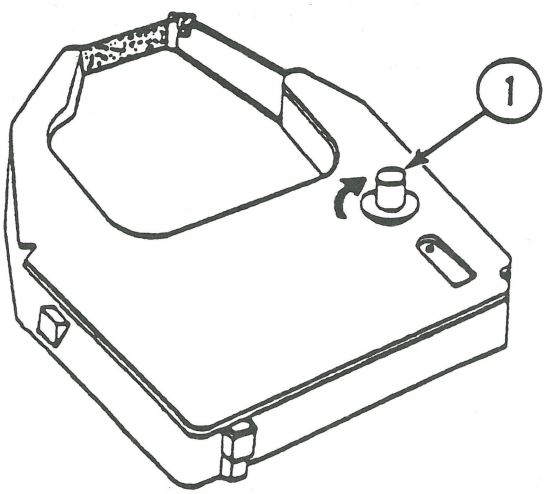


FIGURE 5

Load Ribbon Cartridge

1. Make sure the power is off.

2. Remove the carrier cover.

3. Get a ribbon cartridge.

4. Place the cartridge on the ribbon support plate.

5. Push down on the cartridge until it snaps into place. (See Figure 4, #1.)

6. On the cartridge, turn the knob in the direction shown until you hear it "click" and the ribbon is taut (see Figure 5, #1).

7. Replace the carrier cover.

Run Self-test

NOTE: If the select button is accidently depressed during power-up, the next data that is sent to the ImageWriter will be a hexadecimal dump. If this problem occurs, power the ImageWriter off and then back on. The printer will power up in the proper mode.

1. Make sure the power is off.

2. Load the paper. Make sure the paper is secure under the roller shaft.

3. To run self-test, press and hold down the form feed switch on the switch panel, then turn the power on. The printer will then start printing out lines of characters. Each line contains the letters of the alphabet, the numbers 0 through 9, and a series of typographical characters.

   NOTE: Press the form feed switch first and make sure it is still pressed down when you turn the power on.

4. To end the test, turn power off.

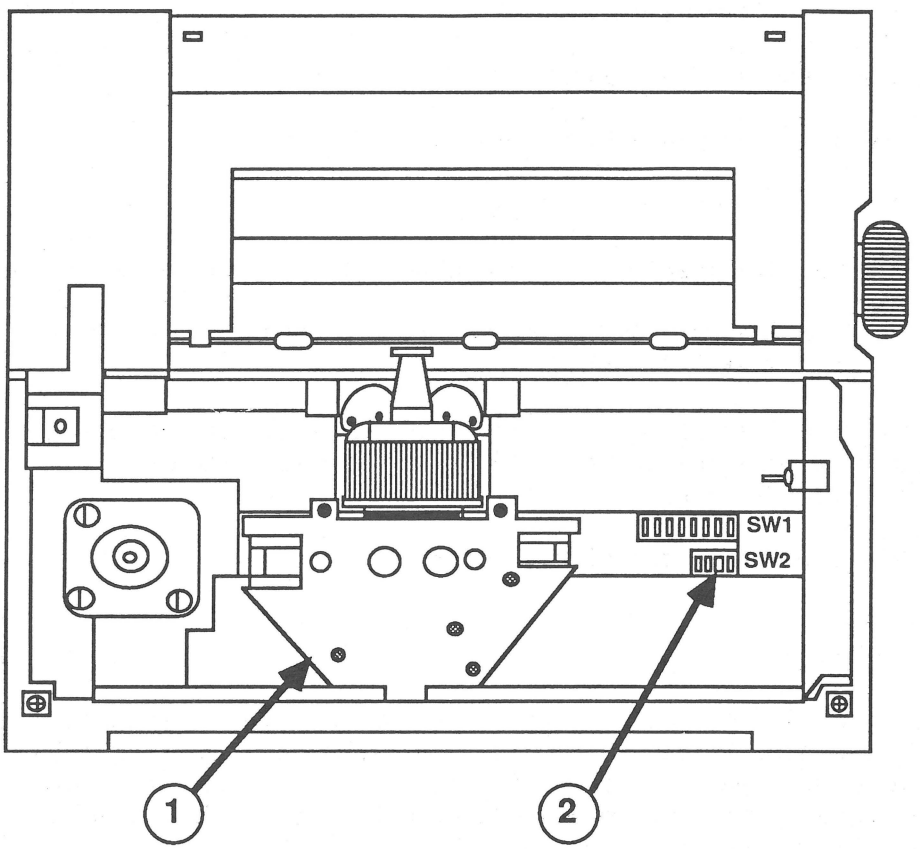


FIGURE 6

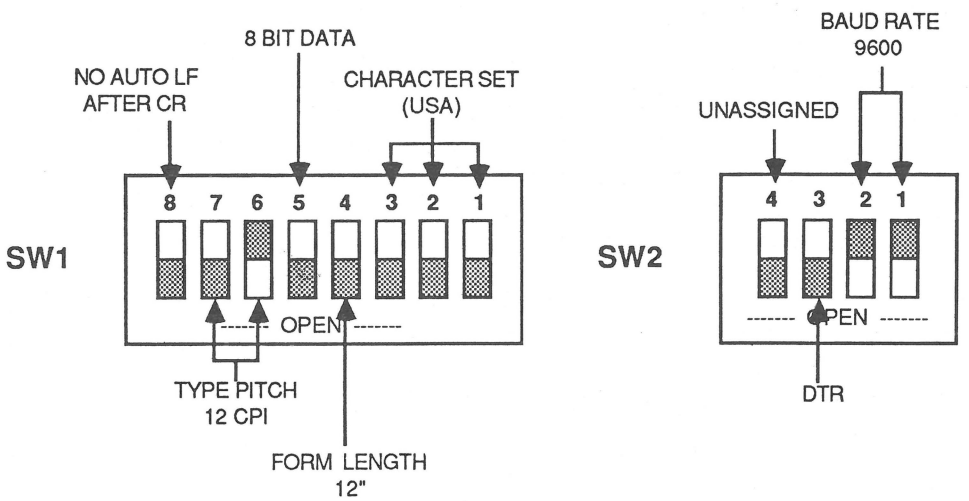


FIGURE 7

B. SET CONFIGURATION SWITCHES

Configuration switches are used to provide variations in the ways that the printer may be operated. There is not a single "correct" setting for the switches as this will vary according to the customer's needs. Only the factory settings are shown. For additional information on switch settings refer to the ImageWriter User's Manual.

For this procedure you will need:

A tiny flatblade screwdriver

1. Make sure power is off.
2. Remove the paper and carrier covers.
3. Slide the carrier all the way to the left. (See Figure 6, #1).
4. Locate switches SW 1 and SW 2. (See Figure 6, #2.)
5. Pull the plastic strip out of the way .
6. Use a small screwdriver to move the switch handles as desired. Figure 7 shows the switches as they were set at the factory: the black half of a box shows which position the switch handle is in. A switch is said to be open when its handle is toward the front of the printer. It is closed when its handle is toward the back of the printer.
7. Push the plastic strip back over the switches.
8. Replace the carrier cover.
9. Run the self test.

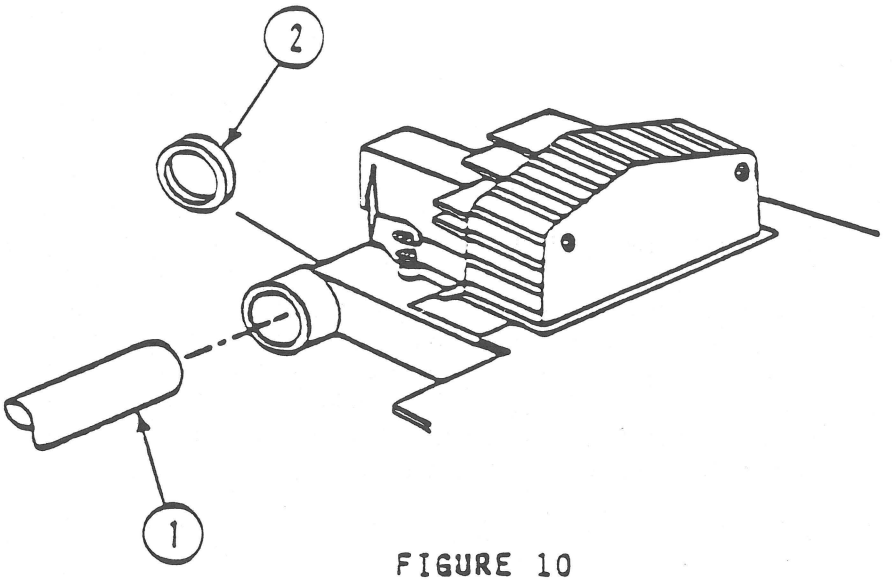


FIGURE 10

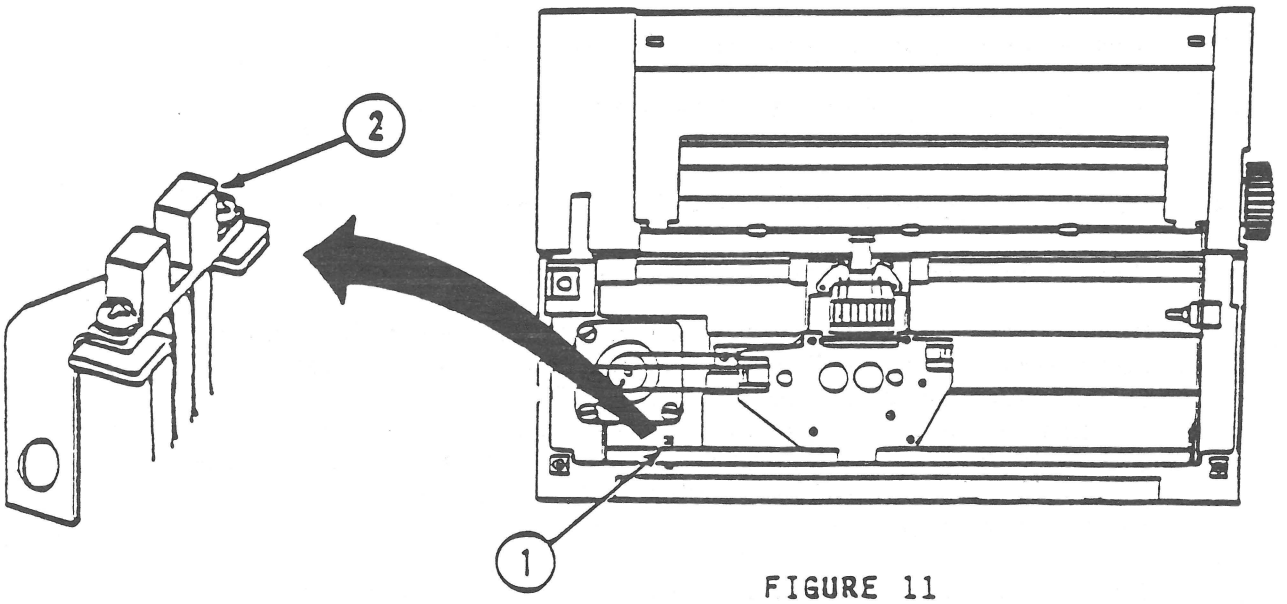


FIGURE 11

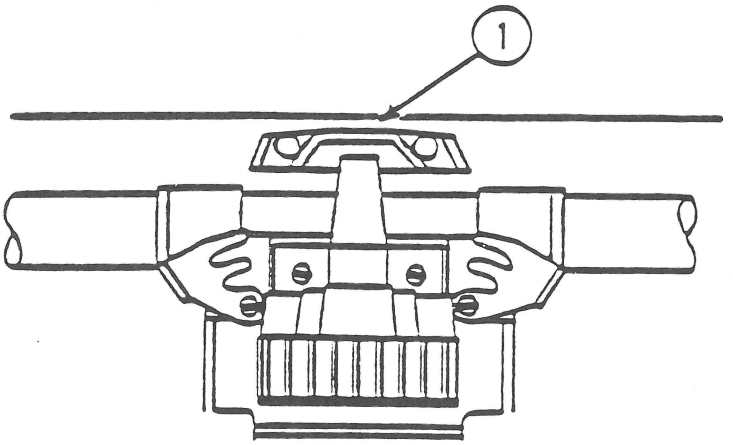


FIGURE 12

C. PERIODIC MAINTENANCE

You should clean the printer as required. You should lubricate the printer only once a year, or more often when operated in a heavy printing environment.

1. Make sure the power is off.

2. Remove the paper cover and the carrier cover.

3. Remove the paper and ribbon cartridge.

4. On the carrier shaft, wipe off any dirt with dry gauze or absorbent cotton (see Figure 10, #1).

5. On the lubrication ring (see Figure 10, #2), apply six drops of lubrication oil (tellus #46, Apple part number 960-0006). Clean off any excess.

6. Find the detector plate. It is on the left front side of the printer, hidden just below the guide rail (see Figure 11, #1).

7. Using a brush, remove any paper dust (see Figure 11, #2).

8. Clean the dot head (see Figure 12, #1) with a low residue cleaner such as isopropyl alcohol or freon.

9. Replace the ribbon cartridge.

10. Perform the self test to ensure optimum printing performance.

D. MAINTENANCE SCHEDULE

The following table summarizes the manufacturers recommended maintenance intervals:

OPERATOR -- As required	DEALER SERVICE -- As required during preventive or corrective maintenance	DEALER SERVICE -- Once every year or 500,000 lines of print	DEALER SERVICE -- Once every 2 years or 1,000,000 lines of print	
	x	x		Clean and lubricate carrier shaft
		x		Lubricate platen sleeve bearings
		x		Lubricate tractor sleeve bearings
	x	x		Check ribbon wire tension
	x	x		Check carrier wire tension
	x	x		Clean dot head
	x	x		Clean detector plate
			x	Check motor mounting screws for looseness
x	x	x		Clean platen, feed rollers, and paper bail rollers
x	x	x		Check print quality

Apple Technical Procedures

ImageWriter

Section 2 – Take-Apart

❑ CONTENTS

2.2 Switch Panel
2.4 Top Cover
2.6 Platen
2.8 Ribbon Wire
2.13 CPU PC Board
2.16 Print Head
2.18 Carrier Wire
2.27 Mechanical Assembly
2.30 Carrier Motor
2.32 Transformer
2.34 Carrier Drive Transistor Assembly
2.36 Noise Filter

❑ SWITCH PANEL

Materials Required None

Remove

1. Remove the power cord from printer.
2. Remove the carrier cover.
3. Push up and forward on the underside of the switch panel near the top (Figure 1, #1) until it pops free. Unplug the switch panel from the connector underneath (Figure 2, #1).

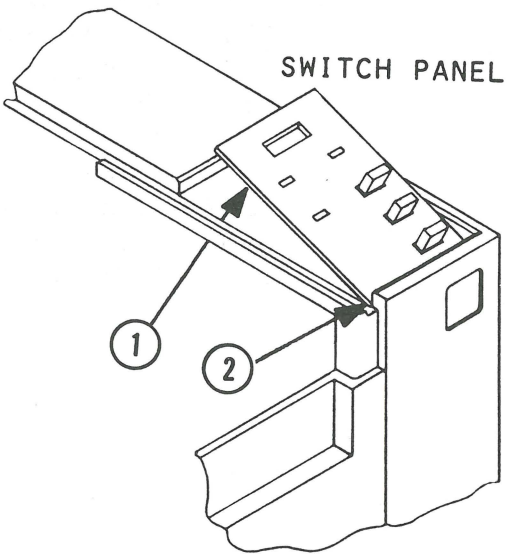


FIGURE 1

Replace

1. Plug the switch panel into its connector (Figure 2, #1).
2. Hook the bottom of the switch panel under the top cover (Figure 1, #2), and press down on the switch panel until it snaps into place.
3. Replace the carrier cover.
4. Plug the printer back in.
5. Turn power on. Check that the power lamp lights.

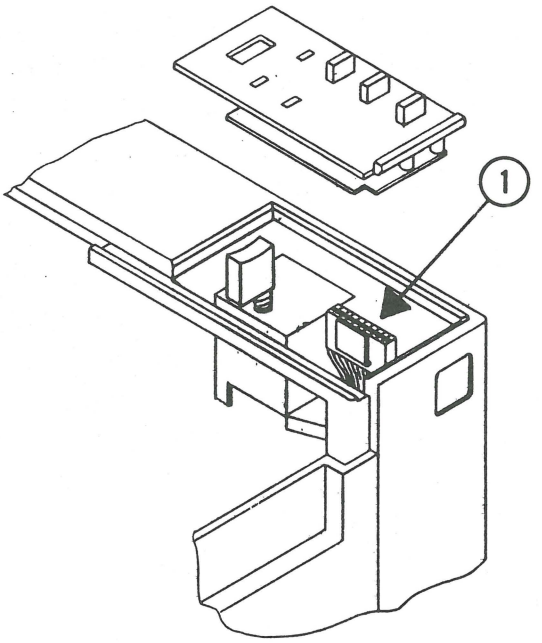


FIGURE 2

❑ TOP COVER

Materials Required

Long-shaft Phillips screwdriver

Remove

1. Remove the power cord.
2. Lift off the carrier cover and pull off the platen knob.
3. Lift off the paper cover.
4. Remove the switch panel.
5. Move the paper release lever to a position midpoint between its forward and rear position.

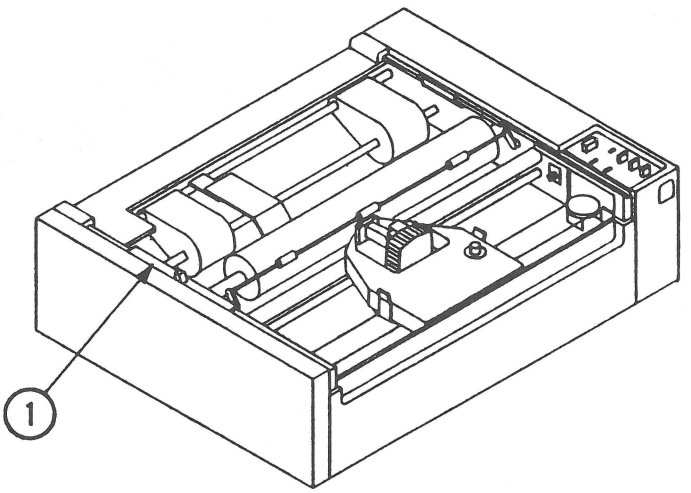


FIGURE 3

6. Replacing the cover will be much easier if you carefully note the position of the sliding cover (Figure 3, #1, and Figure 4, #1) for the paper release lever. This small piece will fall free unless held in place when the top is removed. Tape it or hold it in place with your thumb when the cover is pulled up.
7. Remove the two screws (Figure 4, #2) at the front of the printer, and lift up the front of the top cover.

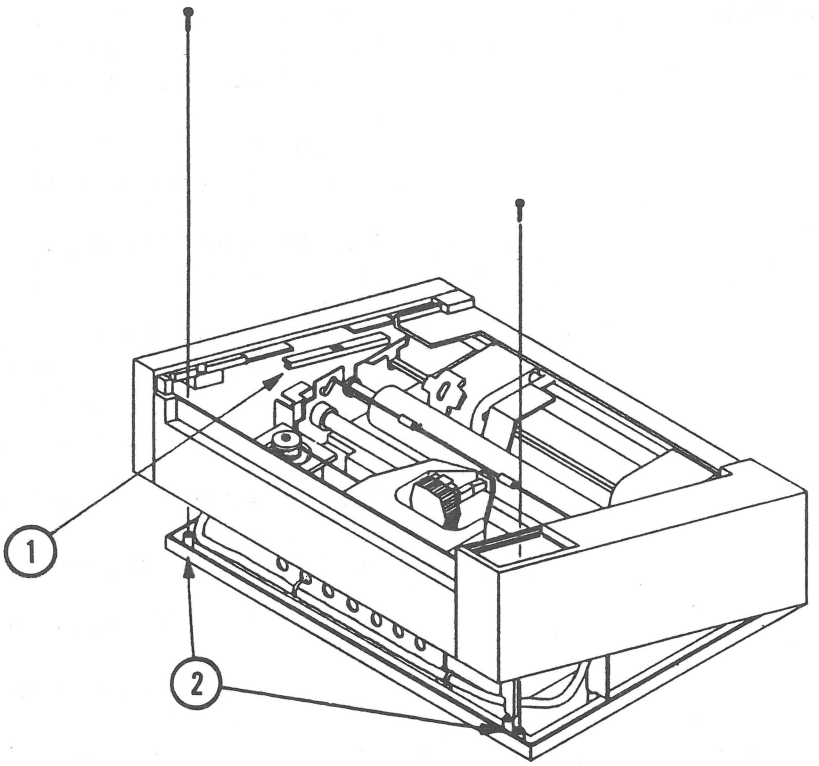


FIGURE 4

8. Unplug the connector (Figure 5, #1) on the left side near the paper release lever.

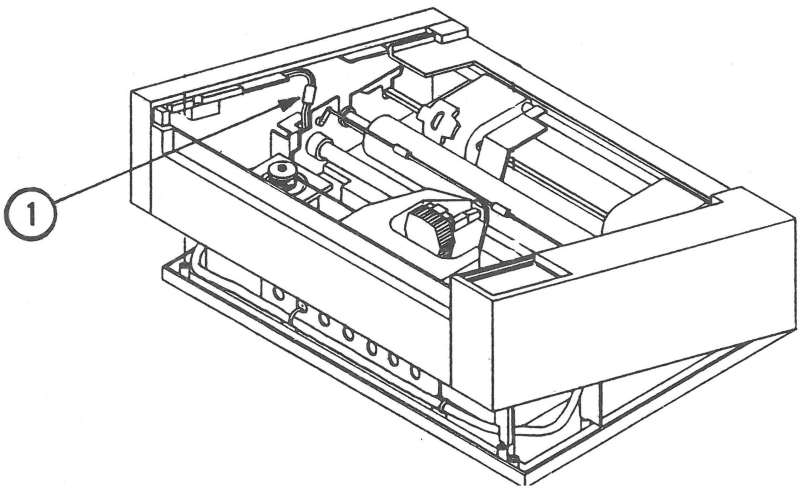


FIGURE 5

9. Push the cover toward the rear to free it from the printer.

Replace

1. Move the paper release lever (Figure 3, #1 and Figure 4, #1) to a position midpoint between its forward and rear position.
2. Tilt the front of the top cover up and hook the back of it on the catches at the rear of the printer.
3. Plug the connector (Figure 5, #1) on the left to its mate.
4. Carefully lower the cover so that it doesn't bind on cables, and hold the sliding paper release cover (Figure 3, #1, and Figure 4, #1) in place as the paper release lever slides through it.
5. Replace the two front screws (Figure 4, #2).
6. Replace the switch panel.
7. Replace the paper cover and carrier cover.
8. Connect power to the printer and run the self test.

❑ PLATEN

Procedures for removing the platen from the 15-Inch ImageWriter can be found in Section 5C.

Materials Required

Small Phillips screwdriver

Remove

1. Remove the top cover.

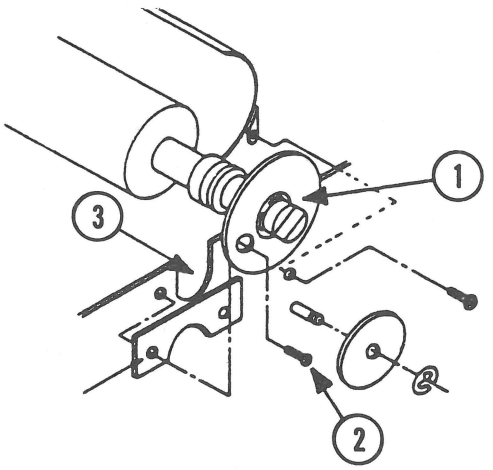


FIGURE 6

2. On the right side of the platen, rotate the paper feed gear (Figure 6, #1) until the hole in it lines up with the platen shaft holder screw (Figure 6, #2). Remove the screw and the platen shaft holder.

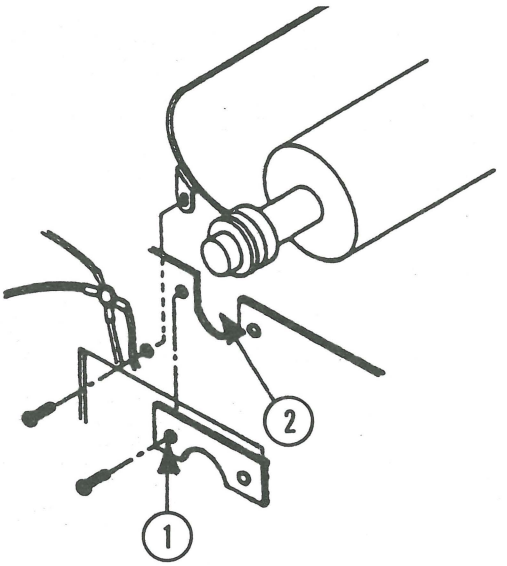


FIGURE 7

3. On the left side of the platen, remove the screw from the shaft holder (Figure 7, #1).

4. The platen can now be removed by lifting it straight up. Removing the paper guide will cause slight deflection of the rear paper guide. If the paper guide becomes misformed, straighten it by hand after replacing the platen.

   Note: The platen can be cleaned by wiping with "Fedron" or "R41," available at printer supply houses.

CAUTION: *Fedron and R41 emit harmful vapors and must be used only in a well-ventilated space. Close containers when not in use. Do not use platen cleaner on plastic parts.*

Replace

1. Slide the platen down into the chassis cutouts (Figure 6, #3 and Figure 7, #2).

2. Replace the right and left platen shaft holders (refer to steps 2, and 3 above).

3. Replace the top cover.

❑ RIBBON WIRE

Materials Required

Small Phillips screwdriver

Remove

1. Remove the power cord.
2. Remove the top cover.
3. Remove the ribbon cartridge.

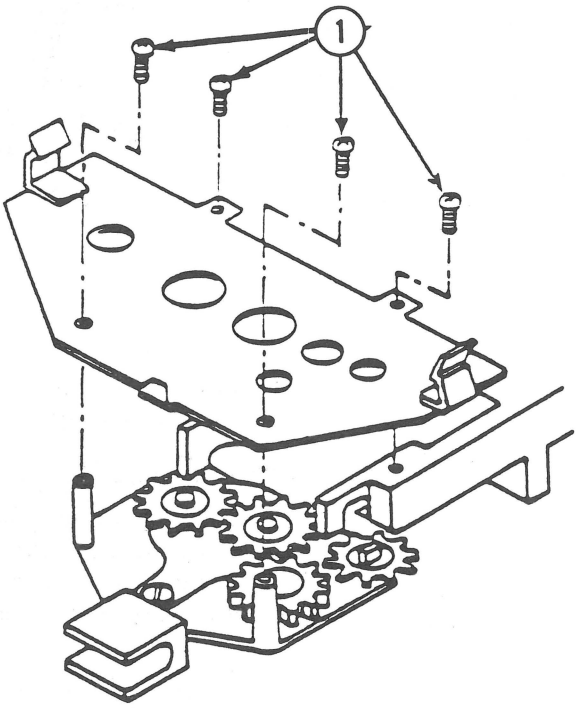


FIGURE 8

4. Remove the four cartridge mount plate fixing screws (Figure 8, #1).
5. **Slowly** lift off the cartridge mount plate.

   Note: There are springs beneath the cartridge mount plate (see Figure 9). They may pop out when you lift up the mount plate.

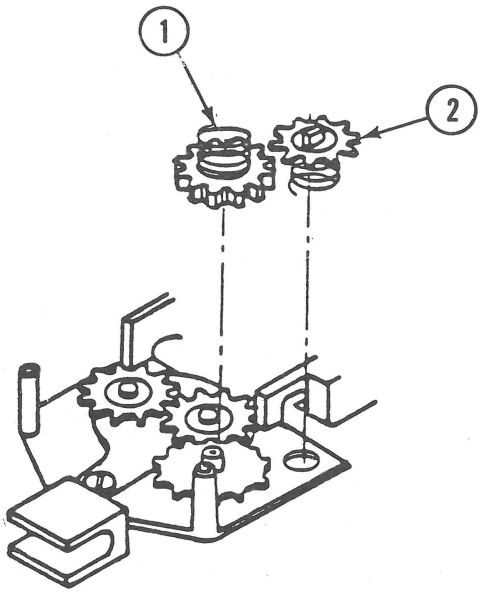


FIGURE 9

6. Pull up the ratchet gear and ratchet spring (Figure 9, #1). If they don't come off easily, carefully pry them off with a flatblade screwdriver.

7. Pull off the cartridge drive gear and the ribbon spring (Figure 9, #2).

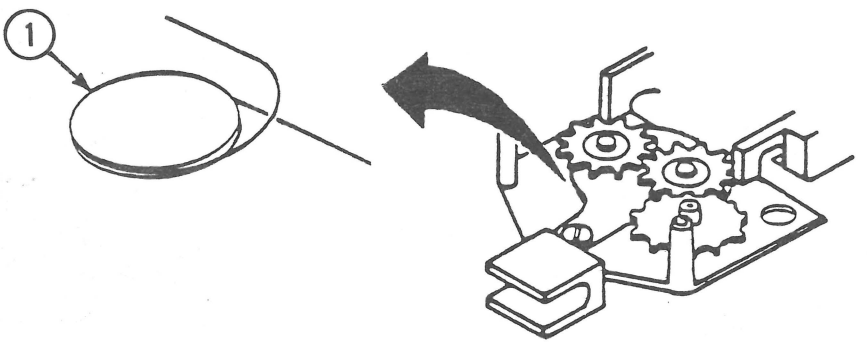


FIGURE 10

8. Notice how the ribbon wire is wrapped around the ribbon pulley gear (Figure 10, #1). Also, notice how the ribbon wire goes through the carrier assembly. This will help you when you have to replace the ribbon wire.

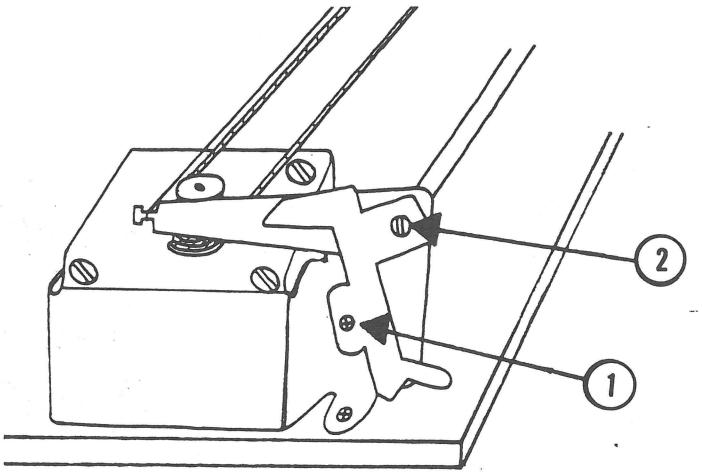


FIGURE 11

9. **(Omit this step for the 15-Inch ImageWriter.)** Remove the screw (Figure 11, #1) that fastens the support bracket on the left side of the printer. Set the bracket aside.

10. Loosen the screw (Figure 11, #2) on the ribbon wire arm on the left side of the printer. Just give it a few turns to ease the tension on the wire.

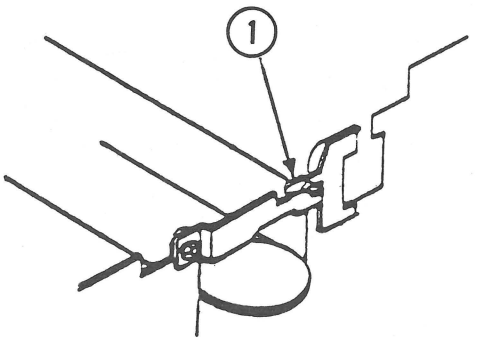


FIGURE 12

11. Remove the wire from the wire holder (Figure 12, #1) on the right side of the printer.

12. Remove the other end of the wire from the wire holder on the left side of the printer.

13. Work the wire free from the ribbon pulley gear. Pull the wire out of the printer.

Replace

1. Attach one end of the ribbon wire to the wire holder on the right side of the printer.

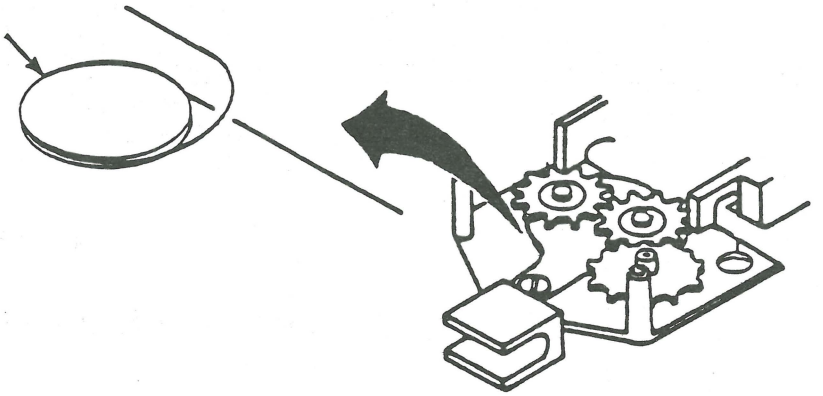


FIGURE 13

2. Work the wire (Figure 13, #1) around the pulley gear as shown.

3. Attach the other end of the ribbon wire to the wire holder on the left side of the printer.

4. Tighten the ribbon wire arm.

5. **(Omit this step for the 15-Inch ImageWriter.)** Replace the support bracket.

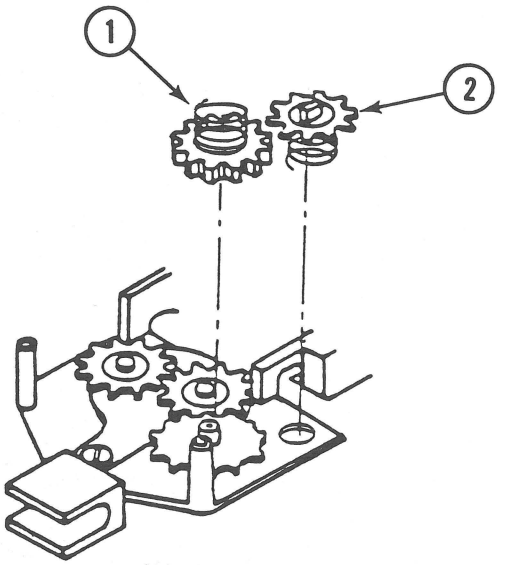


FIGURE 14

6. Replace the ratchet spring and ratchet gear (Figure 14, #1).

   Note: The small spring goes with the small gear and the large spring goes with the large gear.

7. Replace the ribbon spring and cartridge drive gear (Figure 14, #2).

8. Replace the four screws that secure the cartridge mount plate (see Figure 8, #1).

9. Replace the ribbon cartridge.

10. Replace the top cover, carrier cover, and platen knob.

11. Run the self-test.

❑ CPU PC BOARD

Materials Required

5.5 mm nutdriver
7 mm nutdriver
Phillips screwdriver

Remove

1. Disconnect the power cord.
2. Remove the carrier cover.
3. Slide the carrier all the way to the right.

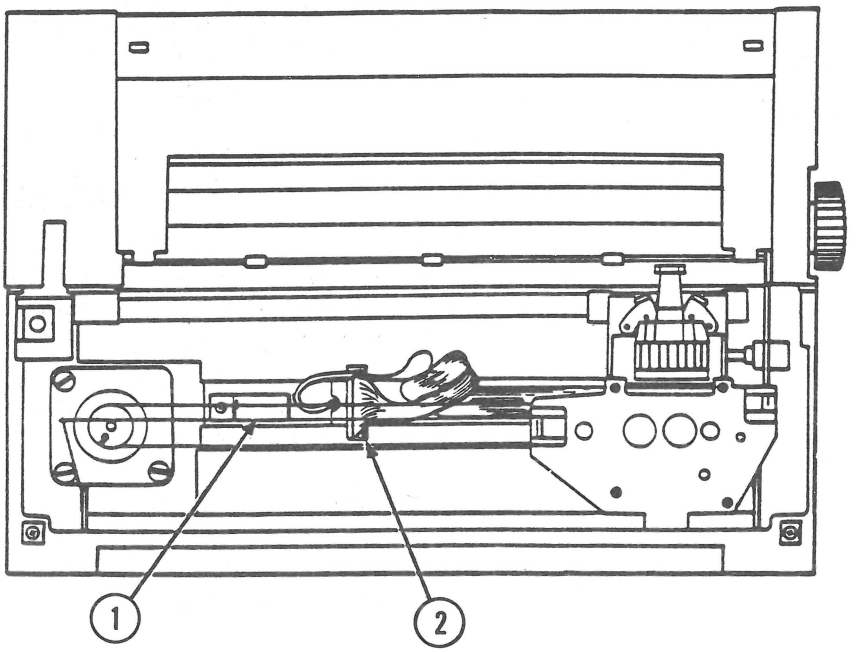


FIGURE 15

4. Loosen, but do not remove, the metal clip (Figure 15, #1) and gently pull up the ribbon until you can reach the print head connector.
5. Gently work free the print head connector (Figure 15, #2). You might use needlenose pliers to grasp the connector.

6. Tuck the print head connector under the cable so it stays out of the way.

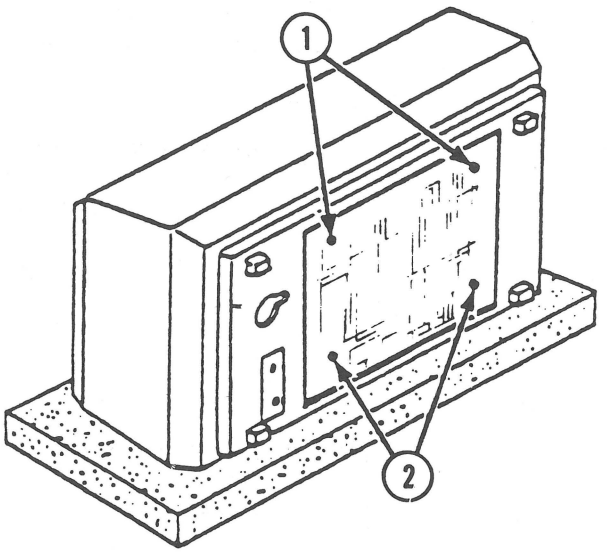


FIGURE 16

7. Using a pad or cushion for protection, set the printer on its back (Figure 16). You will have to hold it in this position for the next few steps.

8. Use a 5.5 mm nutdriver to remove the four nuts from the bottom panel.

9. Pull off the panel.

10. Use an 7 mm nutdriver to remove the four CPU PC board nuts (Figure 16, #1).

11. Gently pull the board toward you. This will help you reach the plastic connectors on the board.

12. Using your fingers, work off the plastic connectors. (Do not pull on the cables.) As you disconnect them, note the position of each connector.

13. When you have all the connectors off, lay the board down on a piece of antistatic foam.

14. Slide the grounding strap from the ground lug.

Note: To avoid damaging the board, be careful not to handle the surface of the board. Hold it by its edges.

Replace

1. Line up the board with the printer.
2. Connect the grounding strap.
3. Connect all connectors except the print head connector.
4. Replace the four CPU PC board nuts (Figure 16, #1).

   Note: If the board binds, reach around the front and pull the slack out of the print head cable.
5. Push the bottom panel back into place. Connect the four panel nuts.
6. Turn the printer right side up.

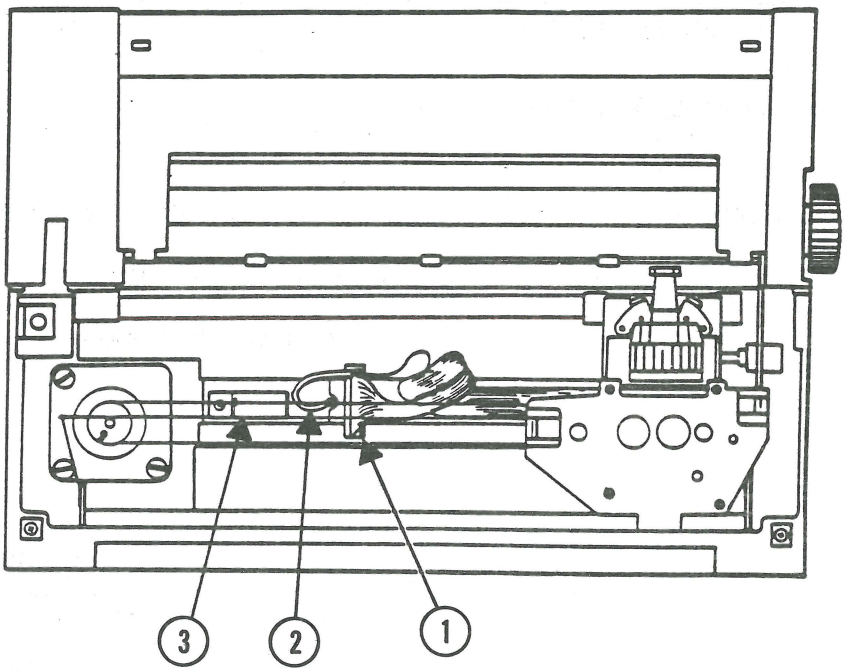


FIGURE 17

7. Push the print head connector (Figure 17, #1) back into the CPU PC board.
8. Tuck the ground wire (Figure 17, #2) of the print head cable under the metal clip (Figure 17, #3).

9. Fold the print head cable and push it under the metal clip so that it is on top of the ground wire. Tighten down the metal clip.

10. Slide the carrier back and forth a few times. It should slide freely from end to end. If the carrier catches on the metal clip, go back and re-fold the print head cable.

11. Replace the carrier cover.

12. Turn the power on.

13. Perform the self-test.

❑ PRINT HEAD

Materials Required

None

Remove

1. Disconnect the power cord.
2. Remove the carrier cover.
3. Remove the ribbon cartridge.

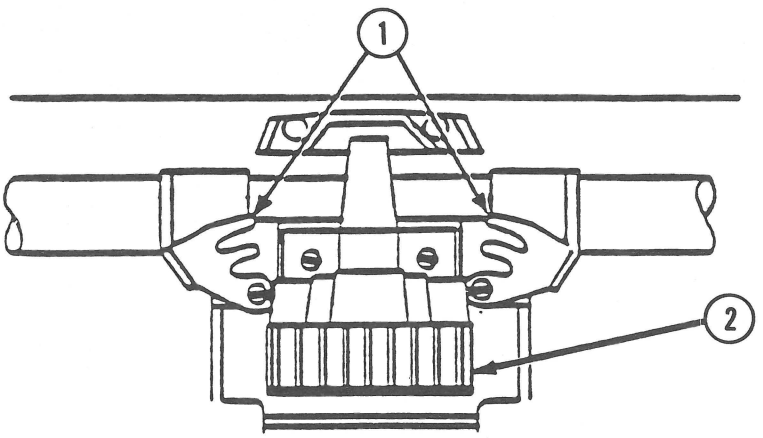


FIGURE 18

4. To free the print head, slide out both print head latches (Figure 18, #1).

5. Pull up the print head (Figure 18, #2). If you have trouble getting it out, pull the paper roller shaft forward. Ease the print head around the roller shaft.

Replace

1. Push in the print head (Figure 18, #2). If you have trouble getting it in, pull the paper roller shaft forward. Ease the print head around the roller shaft.

2. To lock the print head in place, slide in the two print head set latches (Figure 18, #1).

Adjust

1. Run the self-test and inspect the print for equal darkness at the top and bottom of the characters. Misadjustment of the print head gap can cause the tails on lower case "g," "p," and "q" to be weakly printed. Also check the top and bottom of upper case "Z" to see if the bottom line is as dark as the top line.

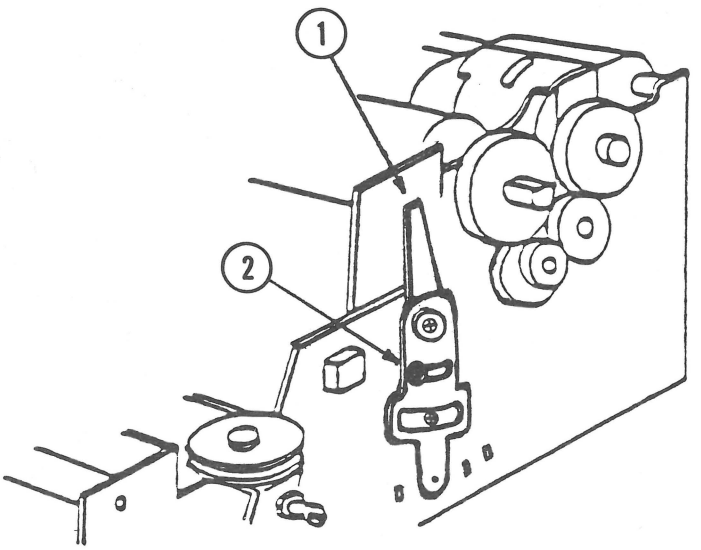


FIGURE 19

2. If the print darkness is uneven, loosen the impression control lever adjustment screw (Figure 19, #2), and move the impression control lever (Figure 19, #1) until the print darkness is equal at the top and bottom of characters. Tighten the screw when the adjustment is complete.

❑ CARRIER WIRE

Materials Required

Small Phillips screwdriver
Small flatblade screwdriver
Needlenose pliers
Adjustable wrench
Tension gauge (Apple PN 077-0014)
Pulley remover tool (Apple PN 076-0043)
Ruler

Remove

1. Disconnect the power cord.
2. Remove the paper cover, ribbon cartridge, and carrier cover.
3. Remove the switch panel and top cover.
4. Remove the two screws located in the base of the housing that hold the switch panel connector. Set the connector aside.
5. Remove the print head.

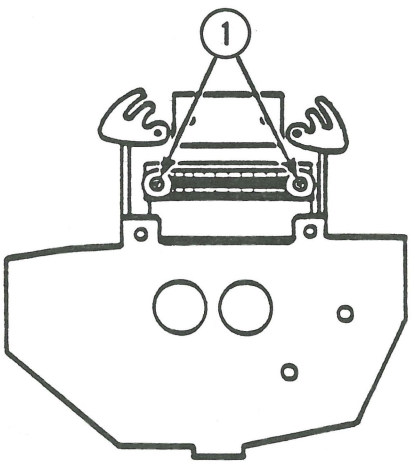


FIGURE 20

6. Remove the two screws (Figure 20, #1) holding the print head connector.
7. Lift up the connector and move it out of the way.

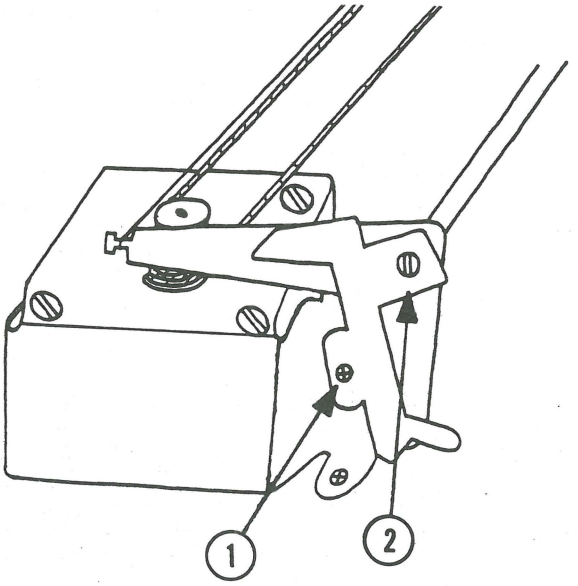


FIGURE 21

8. **(Omit this step for the 15-Inch ImageWriter.)** Remove the screw (Figure 21, #1) on the left end of the carrier guide shaft, and set aside the support brace.

9. Remove the screw (Figure 21, #2) on the left end of the guide shaft, and remove the ribbon wire arm.

10. Free both ends of the ribbon wire. Loop the ends over the carrier and tie them together out of the way.

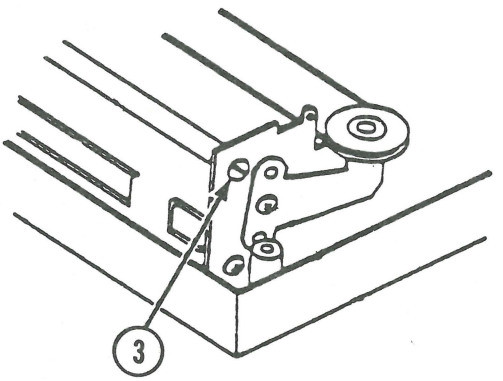


FIGURE 22

11. Remove the screw (Figure 22, #3) on the right end of the shaft.

12. Pull out the carrier guide shaft.

13. Move the carrier to the right side.

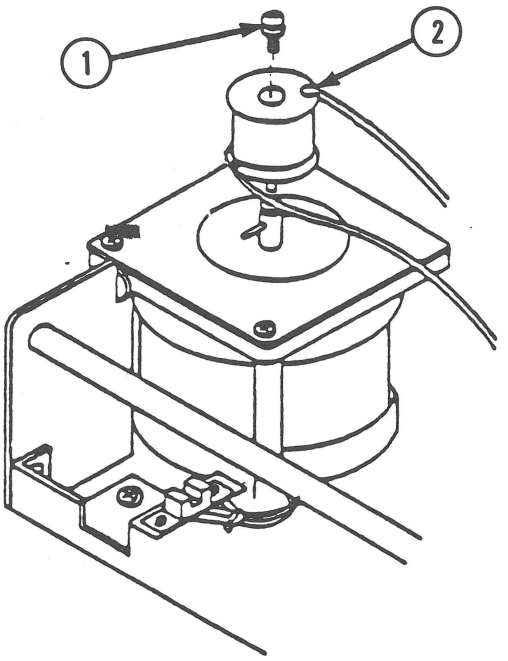


FIGURE 23

14. Use a Phillips screwdriver to remove the screw (Figure 23, #1) from the top of the motor pulley.

    Note: The pulley can be stopped from turning by holding the carrier in place.

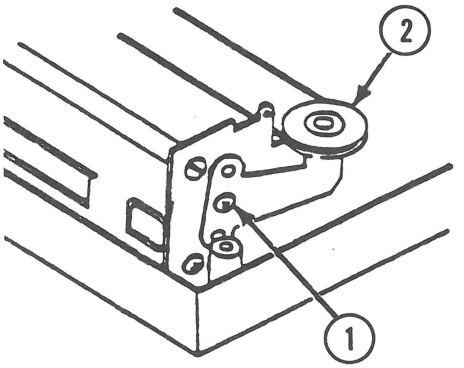


FIGURE 24

15. Loosen the screw (Figure 24, #1) on the tension arm.

16. Slip off the wire from the idler pulley (Figure 24, #2).

17. Remove the top end of the carrier wire (Figure 23, #2).

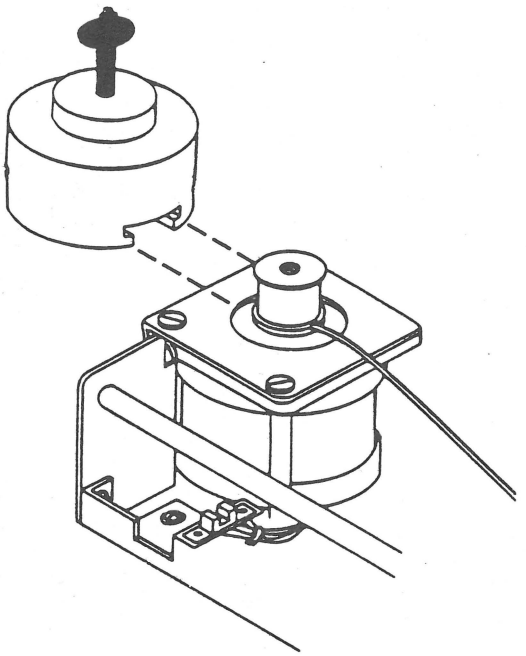


FIGURE 25

18. Use the pulley remover to take off the motor pulley. Slide the pulley remover onto the top of the pulley, and turn the screw clockwise until the pulley is free (see Figure 25).

    Note: At this time, make sure that two copper shims are on the arms of the motor pulley shaft. (The 15-Inch ImageWriter does not use shims.)

19. Unwind the carrier wire.

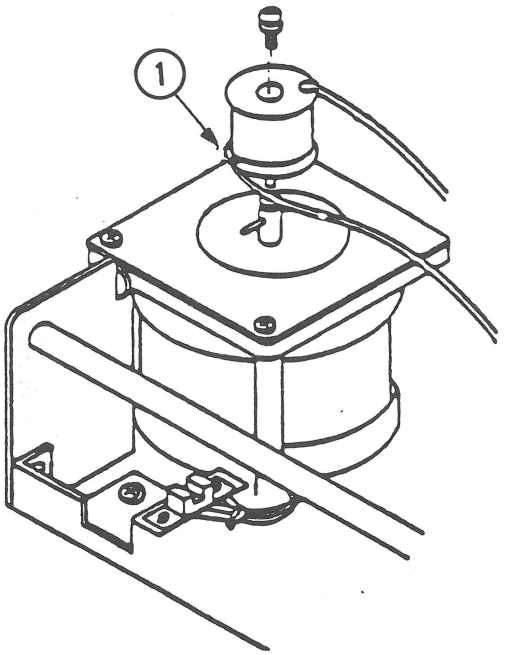


FIGURE 26

20. Remove the bottom end of the carrier wire (Figure 26, #1) from the motor pulley.

21. Lift up the carrier.

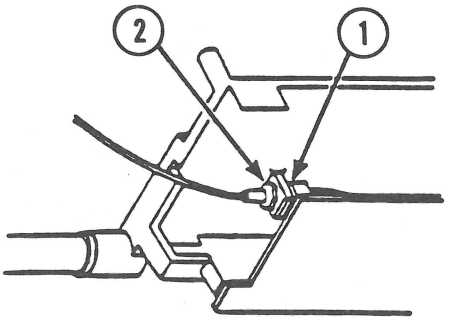


FIGURE 27

22. Using an adjustable wrench, hold the nut (Figure 27, #1) on the right side of the carrier wire in place. Using needlenose pliers, remove the wire nut (Figure 27, #2) on the left side of the carrier wire.

23. Grab the carrier wire on either side of the black rubber sleeve. Pull out the carrier wire, the nuts, and the sleeve.

    Note: When you remove the carrier wire, first push out the metal tube, which is inside; then the wire, the two nuts, and the black rubber sleeve will all come out together. The wire does not slide out of the two nuts. You must pull the wire, the nuts, and the sleeve out of the slot at the bottom of the carrier assembly.

Replace

1. Raise up the carrier.

2. Before you insert the new carrier wire, make sure that the long end of the wire runs toward the right side of the printer.

3. Push the black rubber sleeve and metal tube back into the slot at the bottom of the carrier assembly. Tighten the wire nut.

4. Take the long end of the wire and wrap it around the idler pulley. The idler pulley is on the far right side of the printer.

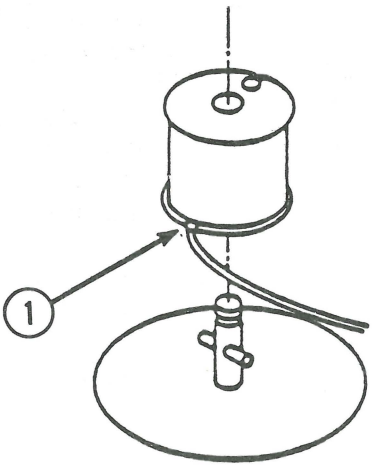


FIGURE 28

5. Work the long end of the wire under the carrier assembly until it reaches the left side of the printer.

6. Insert the long end of the wire into the bottom slot (Figure 28, #1) on the motor pulley.

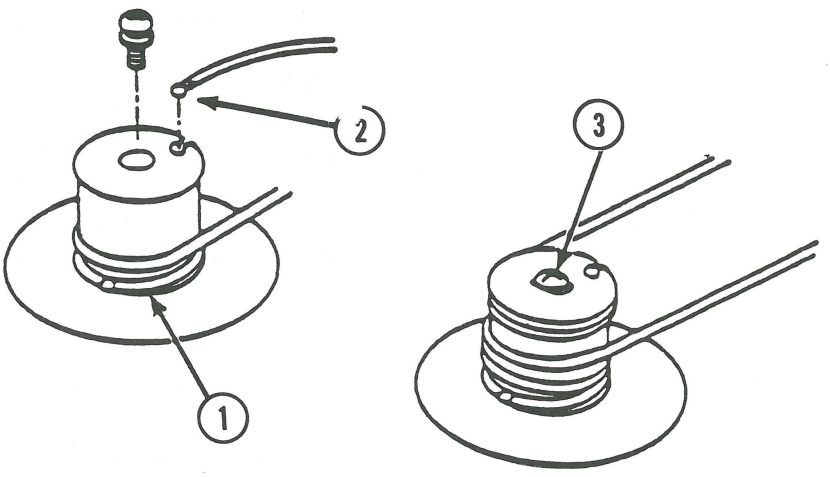


FIGURE 29

7. Make sure that the two copper shims are still on the arms of the motor pulley shaft. (Shims are not used on the 15-Inch ImageWriter.)

8. Seat the motor pulley (Figure 29, #1) on the shaft .

9. Hold the wire snug against the motor pulley with your thumb. Turn the pulley clockwise and wind up the carrier wire (Figure 29, #1).

10. **(For the 15-Inch ImageWriter only, wrap the carrier wire around the left pulley before you continue.)** Insert the short end of the wire into the top slot of the motor pulley (Figure 29, #2).

11. Wrap the wire around the pulley in a clockwise direction.

12. Replace the motor pulley screw (Figure 29, #3).

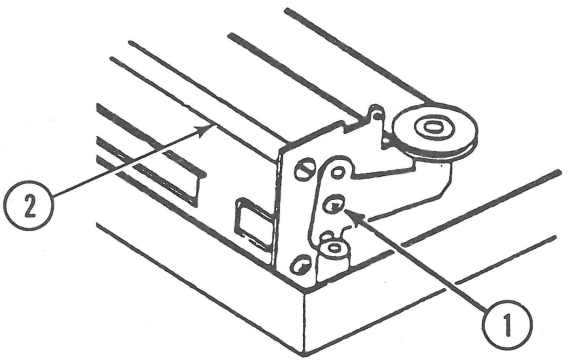


FIGURE 30

13. Tighten the tension screw (Figure 30, #1) until the wire is taut.

14. Replace the front guide (Figure 30, #2).

15. Replace the two front guide shaft screws and the ribbon wire arm. Make sure the brass bushing is properly seated in the carrier assembly.

16. Untie the ribbon wire.

17. Attach the right end of the ribbon wire to the ribbon wire post just above the idler pulley.

18. Attach the left end of the ribbon wire to the ribbon wire post just above the motor pulley.

    Note: If the ribbon wire comes off the ribbon pulley gear, you must put it back on. Procedures are in Section 2D.

19. **(Omit this step for the 15-Inch ImageWriter.)** Replace the support brace.

20. Replace the two screws in the housing that holds the switch panel connector.

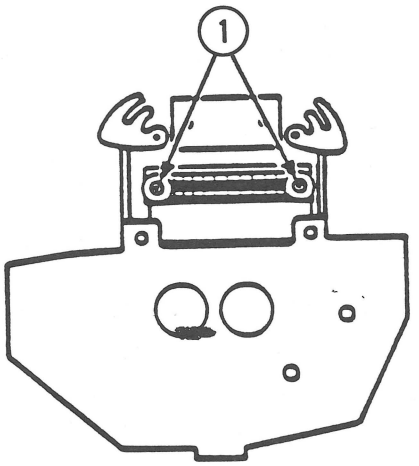


FIGURE 31

21. Replace the two screws (Figure 31, #1) that secure the print head connector.

22. Replace the print head.

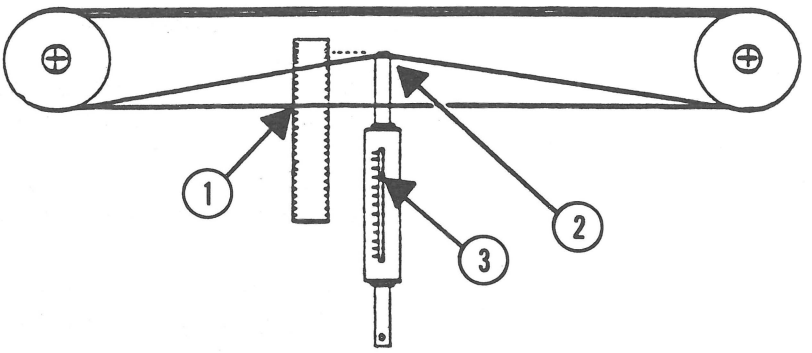


FIGURE 32

23. Lay a ruler under the front edge of the carrier wire (use the rear edge for the 15-Inch ImageWriter), and visually mark the point where the carrier wire crosses the ruler (Figure 32, #1). With the carriage assembly at the far left, push the carrier wire at its center with a tension gauge (Figure 32, #2).

24. When the wire has been pushed 3/8 of an inch away from its original position, check the tension gauge (Figure 32, #3). It should read 1 lb. If it doesn't, adjust the screw of the tension arm and recheck.

25. Replace the top cover, switch panel, carrier cover, and the paper cover. Load paper and a ribbon cassette.

26. Run the self-test.

❑ MECHANICAL ASSEMBLY

Procedures for removing the mechanical assembly from the 15-Inch ImageWriter can be found in Section 5C.

Materials Required

Small Phillips screwdriver
5.5 mm nutdriver
7 mm nutdriver

Remove

1. Disconnect the power cord.

2. Remove the paper cover and carrier cover.

3. Remove the top cover and CPU PC board.

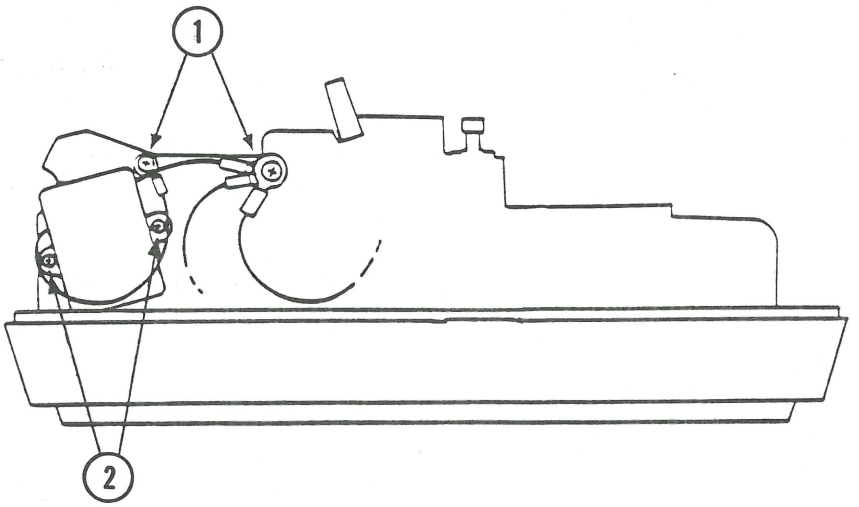


FIGURE 33

4. Remove the screws and washers (Figure 33, #1) holding ground straps to the side frame.

5. Remove the two screws (Figure 33, #2) from the noise filter.

6. Gently pull the noise filter away from the frame.

7. Remove the two screws that fasten the power switch housing.

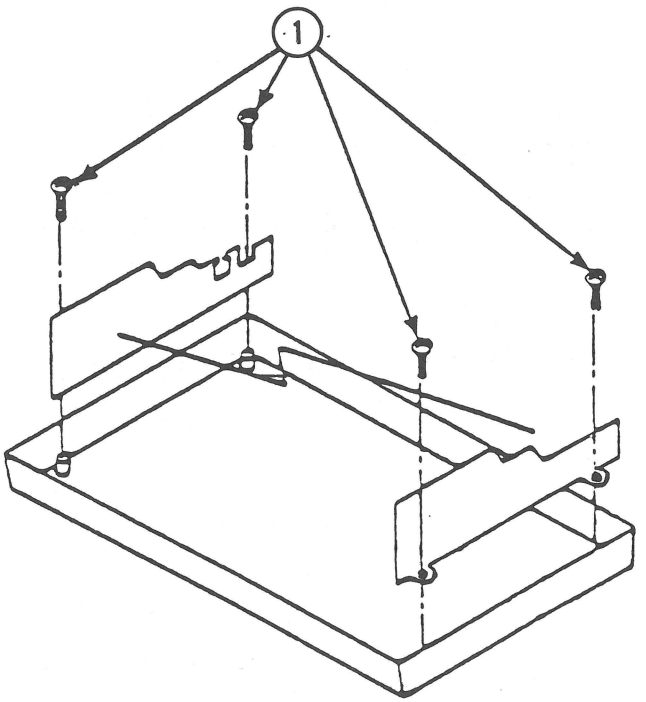


FIGURE 34

8. To free the mechanical assembly, remove the four screws (Figure 34, #1) holding it to the bottom cover.

9. Lift the mechanical assembly out of the bottom cover.

Replace

1. Put the mechanical assembly back into the bottom cover.
2. Replace the four screws (Figure 34, #1).

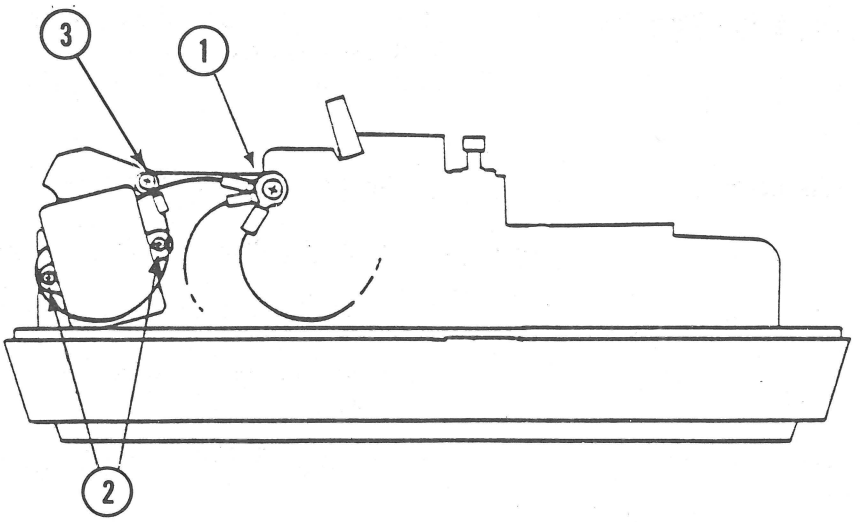


FIGURE 35

3. Position the noise filter on the frame. It rests at an angle.
4. Replace the noise filter screws (Figure 35, #2).
5. Put together the screw, washer, four ground cables, and star washer, and screw them into the side frame (see Figure 35, #1). Do the same with the other two ground cables (Figure 35, #3).
6. Replace the CPU PC board.
7. Replace the two screws that secure the power switch housing.
8. Replace the top cover, carrier cover, and paper cover.
9. Load the paper and ribbon cartridge.
10. Power on and perform the self-test.

❑ CARRIER MOTOR

Procedures for removing the carrier motor from the 15-Inch ImageWriter can be found in Section 5C.

Materials Required

Medium flatblade screwdriver
Phillips screwdriver
Pulley remover

Remove

1. Make sure the power is off.
2. Remove the mechanical assembly.
3. Loosen the ribbon wire tension arm.
4. Free the ribbon wire from the two ribbon wire posts.
5. Tie the wire in a loose knot over the carrier.
6. Remove the motor pulley.

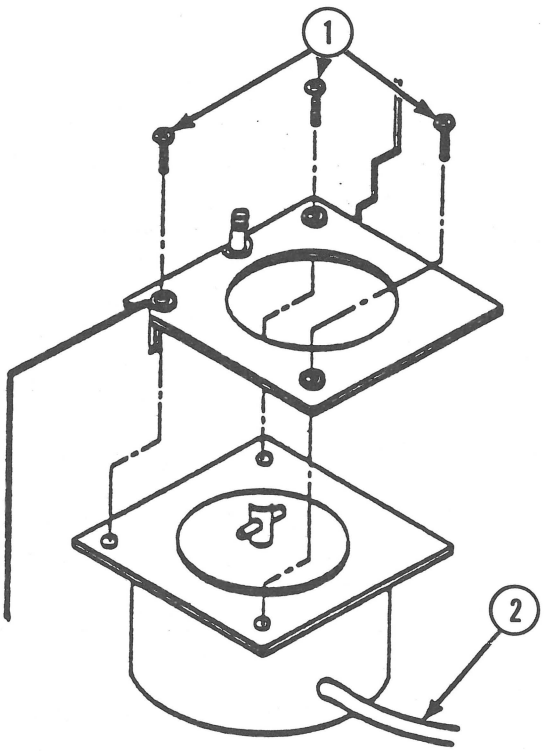


FIGURE 36

7. Remove the three motor mounting screws (Figure 36, #1).

   Note: When you remove the last screw, the motor will drop out of the mechanical assembly. As you remove the last screw, hold onto the motor. Carefully note the position of the motor cable (Figure 36, #2). Then let the motor fall free.

Replace

1. From the front side of the mechanical assembly, put the motor in its slot. Make sure the cable is on the right side of the motor. It should be pointing in the general direction of the idler pulley.
2. Replace the three motor mounting screws (Figure 36, #1). Do not over-tighten them.
3. Replace the motor pulley.
4. Put the motor pulley back on the motor.
5. Replace the motor pulley screw.
6. Untie the ribbon wire.
7. Fix the ribbon wire to the ribbon wire posts.
8. Tighten the ribbon wire arm.
9. Replace the mechanical assembly.
10. Power on and run the self-test.

❑ TRANSFORMER

Materials Required

Needlenose pliers
Small Phillips screwdriver

Remove

1. Remove the mechanical assembly.

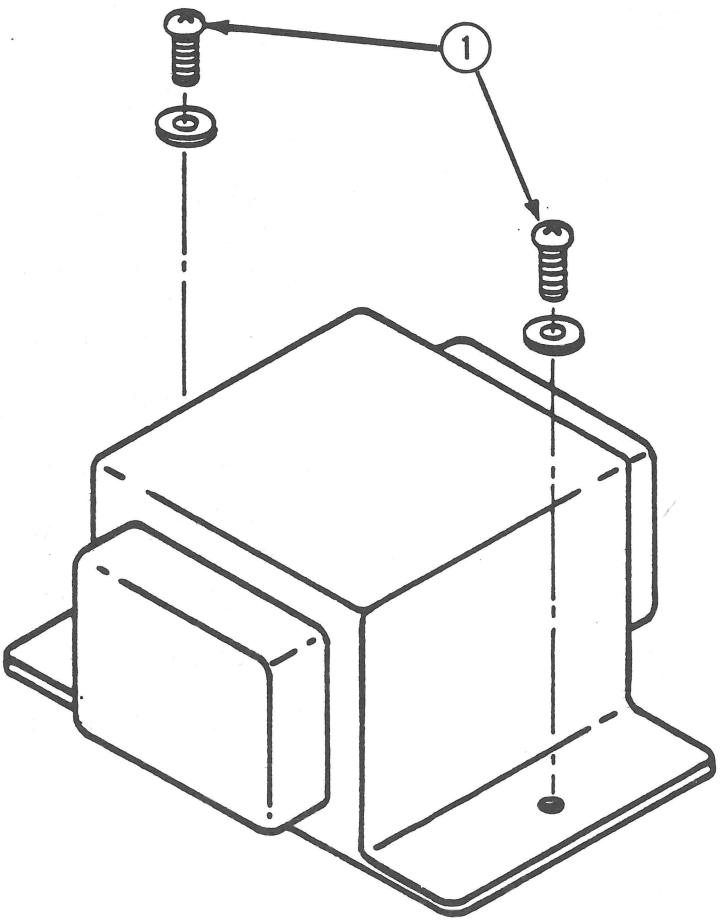


FIGURE 37

2. Remove the two screws (Figure 37, #1) from the transformer.

Replace

1. Make sure the threaded plate (Figure 38, #1) under the bottom of the printer is in position.

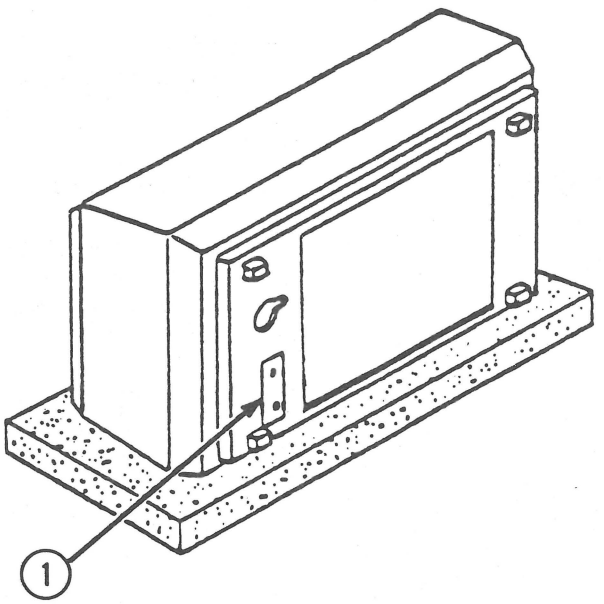


FIGURE 38

2. Put the transformer in place.
3. Screw down the transformer.
4. Replace the mechanical assembly.
5. Power on and run the self-test.

❑ CARRIER DRIVE TRANSISTOR ASSEMBLY

Materials Required

5.5 mm nutdriver
7 mm nutdriver
Phillips screwdriver
Diagonal cutters

Remove

1. Remove the CPU PC board.

2. Turn the printer upside down. With the CPU PC board removed, locate the carrier drive transistor assembly (Figure 39, #3), which includes connector, cable, and four transistors.

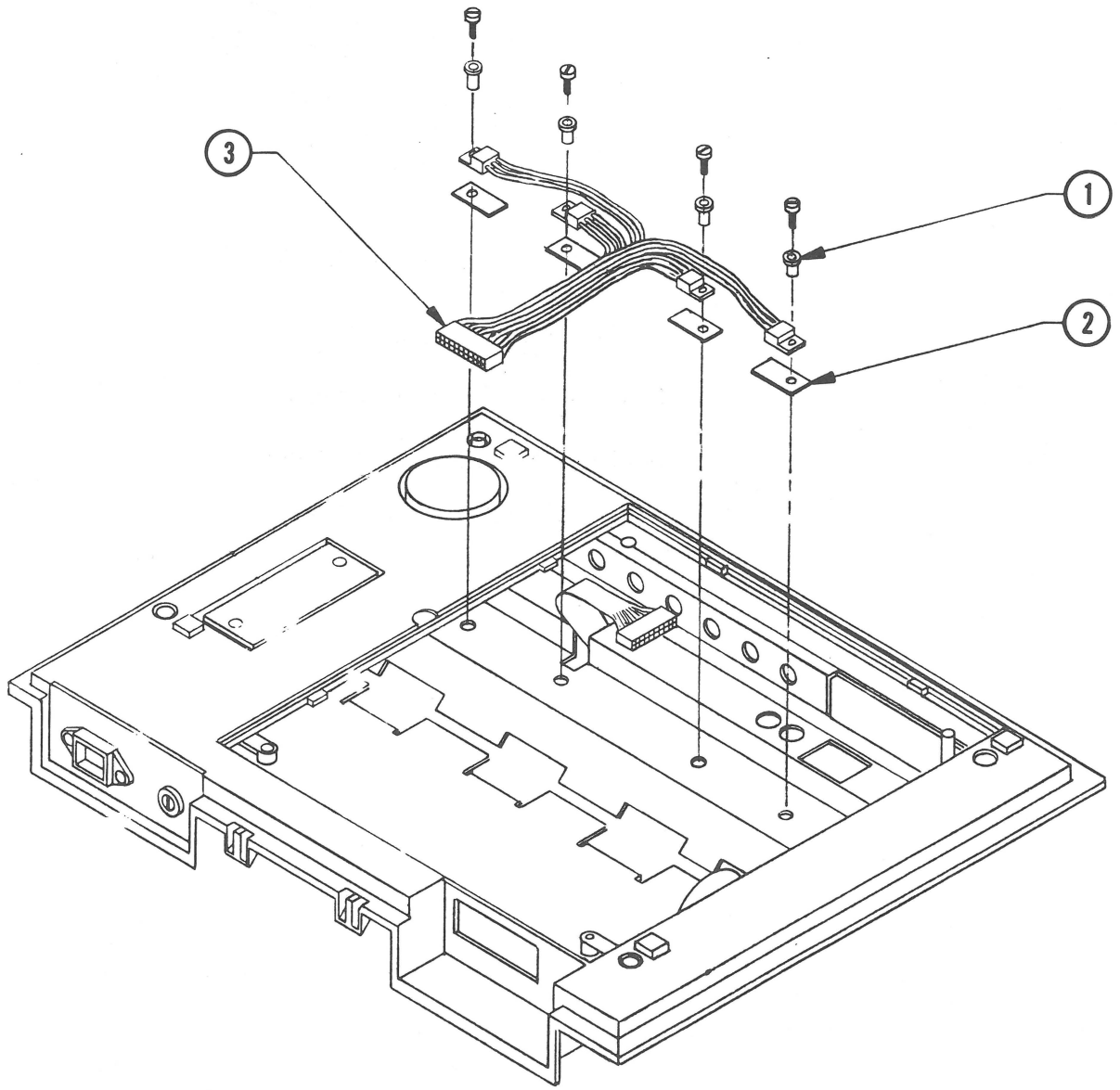


FIGURE 39

3. Use the Phillips screwdriver to remove the four carrier drive transistors.

IMPORTANT: *Save the plastic insulators (Figure 39, #2), the washers (Figure 39, #1), and the screws.* ***Do not install them on the return module.***

4. Cut the cable tie holding the assembly to the frame.

Replace

1. Position the printer so that it is upside down with the power plug receptacle pointed toward you. Position a plastic insulator between each transistor and the printer frame so that no part of the transistor contacts the frame.

CAUTION: *Contact between a transistor and the frame can cause permanent damage to the transistor.*

2. Install the transistors as follows:

   Transistor with black lead - far left
   Transistor with white lead - left center
   Transistor with yellow lead - right center
   Transistor with orange lead - far right

3. Replace the CPU PC board.

❑ NOISE FILTER

Materials Required

Soldering iron (60 watt, 700 degrees)
Diagonal cutters
Solder (60/40 resin core)
Heat shrink tubing

Remove

1. Remove the top cover.

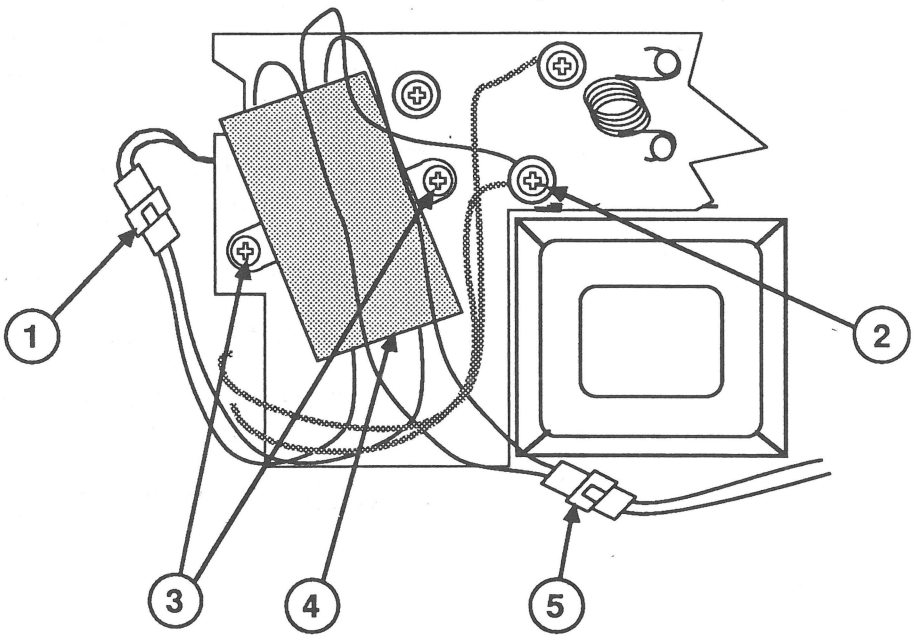


FIGURE 40

2. Disconnect the noise filter from the AC receptacle by unplugging the 2-pin connector at the rear of the printer (Figure 40, #1).

3. Remove the Phillips screw (Figure 40, #2) that holds the three ground wires to the printer chassis.

4. Remove the two Phillips screws (Figure 40, #3) that attach the noise filter (Figure 40, #4) to the printer chassis.

5. Disconnect the noise filter from the power switch by unplugging the 2-pin connector (Figure 40, #5) at the side of the printer.

If you are working on an ImageWriter that does not have a connector to disconnect the noise filter from the power switch, cut the two black wires running from the noise filter to the power switch. Do this about four inches from the noise filter.

Replace

1. Place the noise filter in position on the chassis and replace the two Phillips screws.

2. Replace the three ground wires and their Phillips screw.

3. Reconnect the 2-pin connector from the AC receptacle.

4. Reconnect the 2-pin connector from the power switch.

   If you are working on an ImageWriter that does not have a connector to connect the noise filter to the power switch, substitute the following steps for step 4:

   a) Cut off the 2-pin connector from the new noise filter.

   b) Strip off about 1/4 inch of insulation from the end of each wire coming from the noise filter.

   c) Strip off about 1/4 inch of insulation from the end of each wire coming from the power switch.

   d) Tin the ends of each of the four wires prepared above.

   e) Slip a 1/2 inch length of heat shrink tubing over each of the two wires coming from the power switch.

   f) Solder together one wire from the power switch and one from the noise filter.

   g) Solder together the other pair of wires.

   h) Slip the heat shrink tubing over the solder connection.

i) Using the heat gun, shrink the tubing around the solder connection until it's snug.

5. Replace the top cover.

Apple Technical Procedures

ImageWriter

Section 3 – Troubleshooting

❑ CONTENTS

3.2 Symptom Table

3A.1 Appendix 3A - Troubleshooting Flow of Information

Note: The ImageWriter printer should be tested with the Apple II Peripherals Diskette. (See "Multi-Product Diagnostics Technical Procedures.")

❑ SYMPTOM TABLE

Problems	Solutions
• *Power lamp not lit*	1. Check that power is turned on. 2. Check that the power cord is plugged in. 3. Check the power fuse at the back of the printer. If it is burned out, replace it and power on again. If fuse blows a second time, replace components in this order: – CPU PC board – Carrier Motor – Transformer 4. If the fuse is OK, swap the power cord. 5. Verify that the small screw holder is in place under the screw that mounts the printer cable to the logic board. If the screw holder is missing, it may have dropped free and be shorting pins. Carefully check the logic board and the inside of the printer for this small screw holder. 6. Check the three fuses on the CPU board and replace any that are blown. Verify that the small screw holder holding the screw that mounts the printer cable to the logic board is in place. It may have dropped free and be shorting pins on the logic board. Carefully check the logic board and the inside of the printer for this small screw holder. If this is not the problem and the fuses blow again, replace components in this order: – Power switch – Carrier motor – Transformer

Problems	Solutions
• *Power lamp on but printer won't print*	1. Check that the top cover is seated properly. If it isn't, close it. Then press SEL and try self-test. 2. Check if the PE lamp is lit on the switch panel. If it is, reload the paper and try the self-test. 3. Check the connectors between the carrier and carrier motor and the CPU PC board. If any of the connectors are loose, connect them. Verify that the dot head connector cable is lying flat under the carrier assembly. 4. Verify that the small screw holder is in place under the screw that mounts the printer cable to the logic board. If the screw holder is missing, it may have dropped free and be shorting pins on the logic board. Carefully check the logic board and the inside of the printer for this small screw holder. 5. Replace components in this order: – CPU PC board – Carrier motor
• *Printer passes self-test but won't print under computer control*	1. Check that the computer is properly powered on and initialized. 2. Check if SEL light is on. If it's off, press SEL and try printing under computer control. If it prints while light is off, replace the switch panel. 3. Make sure that the interface cable between the printer and the computer is connected and secured at both ends. 4. Check *ImageWriter User's Manual* or *Peripheral Interface Guide* for correct setting of configuration switches on the printer and the interface card. 5. Replace components in this order: – Apple interface cable – CPU PC board – Carrier drive transistor assembly – Carrier motor

Problems	Solutions
• *Print quality problem: dots missing*	1. Make sure dot head is in place. 2. Make sure dot head is not clogged with dust or dirt. 3. Make sure dot head connector is plugged properly into CPU PC board. 4. Verify that the impression control lever is properly set. Push it away from you to its forward-most position if using a single sheet of paper. 5. Replace components in this order: – Dot head – CPU PC board
• *Print quality problem: printing too light or intensity varies*	1. Check that impression control lever is in the proper position. Push it away from you to its forward-most position if using a single sheet of paper. 2. Substitute new ribbon cartridge. 3. Check the ribbon wire tension. If too loose, adjust as necessary. 4. Adjust intensity pot located under the clear plastic sheet that covers the configuration switches. Locate VR2 IMPRES and adjust for optimum print density. 5. Replace components in this order: – Ribbon cassette – Dot head – CPU PC board
• *Print quality problem: horizontal spacing irregular*	1. Check if carrier wire is strung properly and within tension specifications. Adjust as necessary. 2. Replace components in this order: – Carrier wire – Carrier drive transistor assembly – Carrier motor – CPU PC board

Problems	Solutions
• *Print quality problems: characters do not align vertically in columns*	1. Locate VR1 ALIGN under the clear plastic sheet that covers the configuration switches. Adjust for optimum vertical alignment. 2. Replace CPU PC board.
• *Erratic carrier motion or burning odor*	1. Replace carrier motor. 2. Replace carrier drive transistor assembly. 3. Replace CPU PC board.
• *Hexadecimal data is printed*	– Power the printer off, then on.
• *Will not wind ribbons properly and will intermittently produce poor-quality print (light)*	1. Replace the ribbon cartridge. 2. Verify the positioning of the springs under the carriage mount plate. Be sure the spring with the greater tension is installed under the ratchet 'B' gear. Refer to the "Illustrated Parts List" for the exact location. 3. Replace the change arm gear. If that does not cure the problem, try another change arm gear.
• *Grinding noise but prints OK (This often happens after replacing the carrier motor)*	***Note:*** You may have to follow the procedure given below several times before the problem is eliminated. 1. Loosen screws that secure carrier motor clamps. 2. Loosen screws that secure the carrier motor to the case. 3. Cross-tighten the screws holding the carrier motor in place until you feel a slight resistance. **DO NOT OVER-TIGHTEN.** If it has been over-tightened, replace the eight rubber grommets and cross-tighten again. 4. Tighten the screws that hold the carrier motor clamps.

Problems	Solutions
• *Carrier assembly grinds on power up*	1. Replace the carrier motor transistors. Be sure the mica insulators and screw insulators are in position. 2. Replace the CPU PC board.
• *R7 on the super serial card blows*	– Replace carrier motor transistors. Be sure the mica insulators and screw insulators are in position.
• *Fuse 5A on the CPU PCB blows when connected to super serial card*	– Replace fuse and print head.
• *Printer has no line feed, carriage movement, or dot fire because fuse 5A has blown. After replacing fuse 5A, new fuse blows during self-test*	A winding has shorted in either the line feed stepper motor or the carriage stepper motor. To check the line feed stepper motor: 1. Remove the logic board. 2. Disconnect CN1, the line feed stepper motor connector. 3. Use an ohmmeter to check that the resistance between the following pins is approximately 65 ohms: pins 6 to 2, 6 to 4, 5 to 1, and 5 to 3. 4. If any measurement does not meet specifications, replace the line feed stepper motor. To check the carriage stepper motor: 1. Remove the logic board. 2. Disconnect CN3, the carriage stepper motor connector. 3. Use an ohmmeter to check that the resistance between the following pins is approximately 10 ohms: pins 6 to 2, 6 to 4, 5 to 1, and 5 to 3. 4. If any measurement does not meet specifications, replace the carriage stepper motor. If both stepper motors are okay, replace the main logic board.

Symptom Chart (Continued)

Problems	Solutions
• *Grinding Noise But Prints Okay (This Often Happens After Replacing the Carrier Motor)*	***Note:*** You may have to follow the procedure given below several times before the problem is eliminated. Perform the following: 1. Loosen screws that secure carrier motor clamps. 2. Loosen screws that secure the carrier motor to the case. 3. Cross tighten the screws holding the carrier motor in place until a slight resistance is felt. **DO NOT OVER TIGHTEN.** If it has been overtightened, replace the eight rubber grommets and cross tighten again. 4. Tighten the screws that hold the carrier motor clamps.
• *R7 on the Super Serial Card Blows*	Replace carrier motor transistors. Be sure the mica insulators and screw insulators are in position.
• *Fuse 5A on the CPU PCB Blows When Connected to Super Serial Card*	Replace fuse and print head.
• *Carrier Assembly Grinds on Power Up*	Replace the components in this order: – Carrier motor transistors. Be sure the mica insulators, and screw insulators are in position. – CPU PC board

ImageWriter Technical Procedures

Appendix 3A

Troubleshooting

Flow of Information

Troubleshooting can be approached in many different ways. Apple recommends two methods in particular: logical troubleshooting, and module swapping in a particular order. For printers, the swapping method can prove very frustrating, so logical troubleshooting is especially helpful.

On the following pages you will find a brief description of what happens when you run the self-test on the ImageWriter. When you troubleshoot an ImageWriter, always attempt to run the self-test before connecting the printer to a computer. If the self-test does not run correctly, you can observe where it stops working. Knowing the flow of information, you can then isolate the problem to the faulty module.

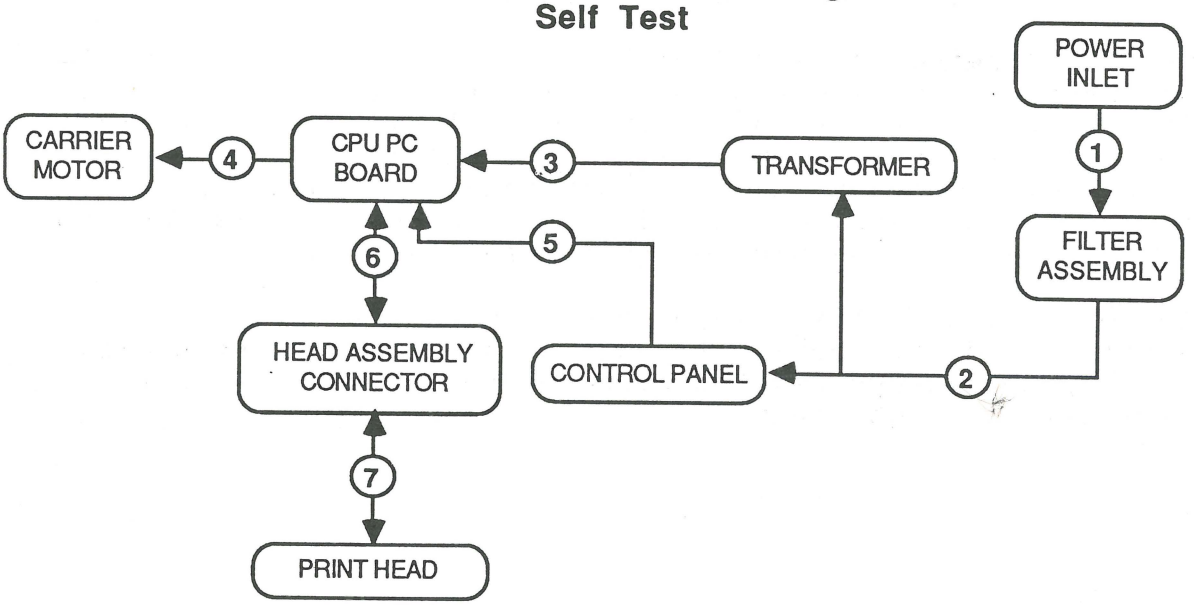
One more thing: Before swapping modules check the ribbon cartridge and any mechanical adjustments that are possible. This may not always fix the problem, but it eliminates two possibilities right away.

FLOW OF INFORMATION

Below is a block diagram of an ImageWriter printer. The numbers on the block diagram indicate the order of events during the self-test and correspond to the numbers in the descriptions.

IMAGEWRITER (Serial)

Flow of Information During Self Test



NOTE

The above information is the same for the Dot Matrix Printer (Parallel)

Procedure

1. The AC power connector is plugged into the power inlet on the rear of the printer.

2. The power switch on the control panel is turned on and the form feed switch is held down. The AC voltage and current is passed through the filter to reduce Radio Frequency Interference (RFI) to FCC standards. The 120 volts is sent to the transformer where it is reduced to 40 volts.

3. The CPU PC board has two areas:

   a. The power supply area, where the 40 volts from the transformer is broken down further and sent to various parts which need it.

   b. The CPU area, which contains the microprocessor electronics.

   The power supply area sends the necessary voltages to the CPU area and the startup sequence is accessed. The startup sequence then notifies the power supply that the CPU is ready.

4. The power supply area accesses the carrier motor. The carrier motor places the carrier assembly at the left side of the platen. The carrier motor moves the carrier assembly back and forth when printing.

5. The form feed switch on the control panel is released, notifying the CPU area that the self-test is to be performed. The CPU notifies the power supply that the self-test is to be performed. The power supply notifies the carrier motor.

6. The CPU area sends the self-test information to the head assembly connector mounted underneath the carrier assembly.

7. The head assembly connector activates the print head. The self-test is performed. The printer will continue running the self-test until powered off.

Apple Technical Procedures

ImageWriter

Section 4 – Illustrated Parts List

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4.1 Top Cover (Figure 1)
4.3 Bottom Cover (Figure 2)
4.5 Main Frame (Figure 3)
4.7 Print Head Assembly (Figure 4)
4.9 Paper Tractor Feed Assembly (Figure 5)
4.11 Platen Carrier Drive Assembly (Figure 6)
4.13 Bottom View (Figure 7)

The figures and lists in this section include all piece parts that can be purchased separately from Apple for the ImageWriter Printer, along with their part numbers. These are the only parts available from Apple. Refer to your *Apple Service Programs* manual for prices.

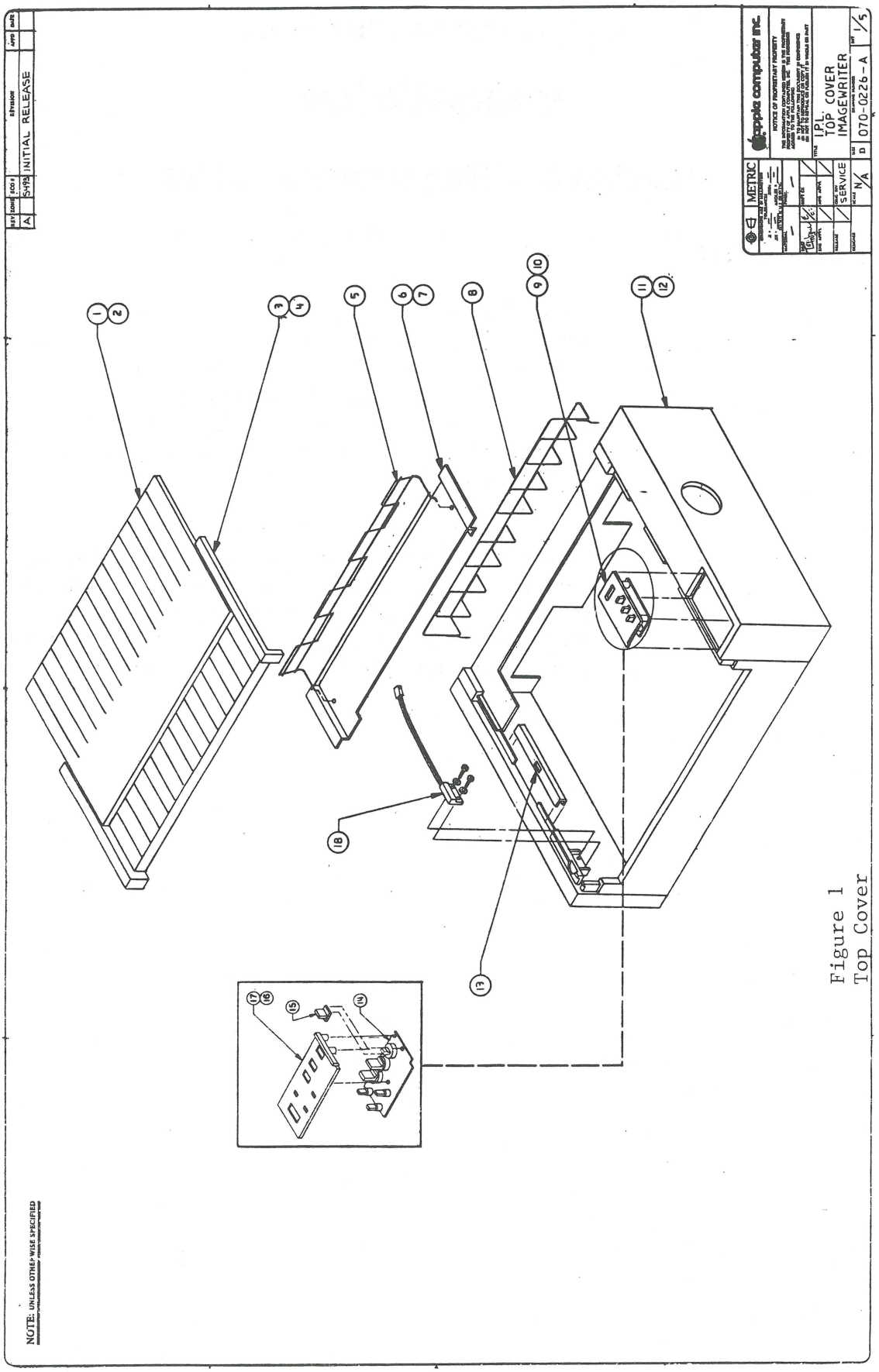

Figure 1
Top Cover

IMAGEWRITER - TOP COVER (Figure 1)

Item	Part No.	Description
1	970-0642	Cover Assembly, Print
2	970-0856	Cover Assembly, Print - 15"
3	970-0641	Cover Assembly, Carrier
4	970-0857	Cover Assembly, Carrier - 15"
5	970-0895	Rack, Paper Separator - 15"
6	970-0643	Cover Assembly, Paper
7	970-0861	Cover Assembly, Paper - 15"
8	970-0896	Rack, Paper Stand - 15"
9	970-0601	Switch, Panel 110V (& 15")
10	970-0599	Switch, Panel 220V (& 15")
11	970-0640	Cover Assembly, Top
12	970-0859	Cover Assembly, Top - 15"
13	970-0648	Side Plate, Friction Release (& 15")
14	970-0866	PCB, Control Panel (& 15")
15	970-0835	Cap, Control Panel Switch (& 15")
16	970-0636	Control Panel, 110V (& 15")
17	970-0644	Control Panel, 220V (& 15")
18	970-0647	Switch, Magnetic Reed (& 15")

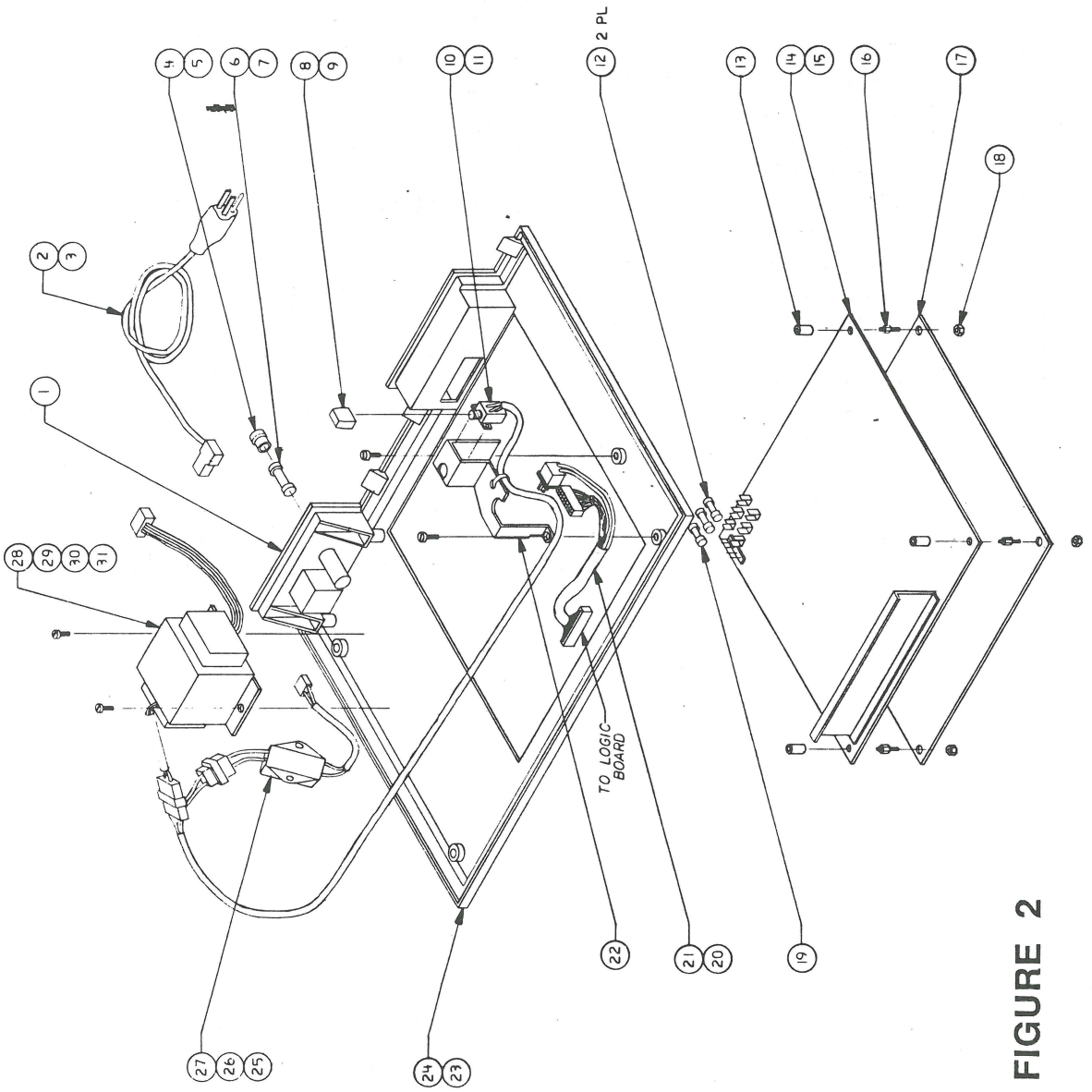

FIGURE 2

IMAGEWRITER - BOTTOM COVER (Figure 2)

Item	Part No.	Description
1	970-0650	Panel, Connector (& 15")
2	970-0635	Power Cord, 110V (& 15")
3	970-0710	Power Cord, 220V (& 15")
4	970-0712	Cap, Fuse, 110V (& 15")
5	970-0713	Cap, Fuse, 220V (& 15")
6	740-0101	Fuse, 2 Amp, 250V (& 15")
7	740-0100	Fuse, 1 Amp, 250V (& 15")
8	970-0649	Cap, Power Switch
9	970-0840	Cap, Power Switch - 15"
10	970-0598	Switch, Power
11	970-0817	Switch, Power - 15"
12	740-0021	Fuse, 3.15 Amp 250V (& 15")
13	970-0720	Stand Off, PCB Mounting (& 15")
14	661-75144	Main Logic PCB
15	661-75199	Main Logic PCB - 15"
16	970-0716	Support Screw, PCB Stand Off (& 15")
17	970-0633	Plate, Bottom (& 15")
18	970-0717	Nut, PCB Stand Off (& 15")
19	740-0022	Fuse, 5 Amp 250V (& 15")
20	970-0715	Cable Assembly, Power Switch/Control Panel
21	970-0867	Cable Assembly, Power Switch/Control Panel - 15"
22	970-0831	Bracket, Power Switch/Cable Mounting - 15"
23	970-0639	Cover Assembly, Bottom
24	970-0860	Cover Assembly, Bottom - 15"
25	970-0711	Filter, Noise, 220V
26	970-0868	Filter, Noise, 110V - Both
27	970-0898	Filter, Noise, 220V - 15"
28	970-0634	Transformer, 110V
29	970-0645	Transformer, 220V
30	970-0865	Transformer, 110V - 15"
31	970-0897	Transformer, 220V - 15"

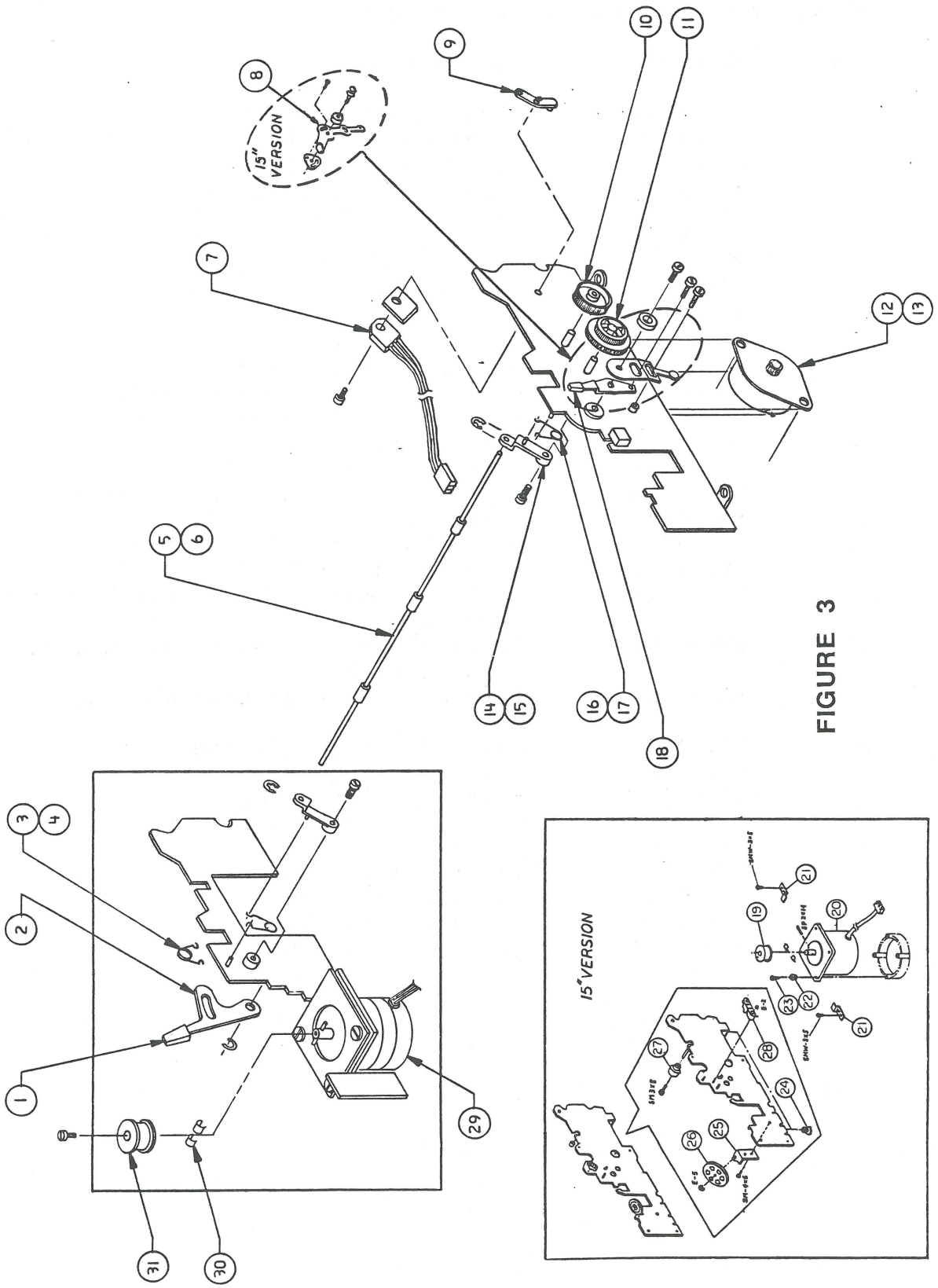

FIGURE 3

IMAGEWRITER - MAIN FRAME (Figure 3)

Item	Part No.	Description
1	970-0839	Cap, Feed Roller Release - 15"
2	970-0850	Lever, Feed Roller - 15"
3	970-0056	Spring, Feed Roller Release
4	970-0832	Spring, Feed Roller Release - 15"
5	699-0110	Shaft Assembly, Paper Bail
6	970-0858	Shaft Assembly, Paper Bail - 15"
7	970-0082	Transistor Assembly, 5V (&15")
8	970-0829	Lever, Impression Control - 15"
9	970-0830	Plate, PCB Support - 15"
10	970-0051	Gear, Idler, Tractor (& 15")
11	970-0052	Gear, Idler, Platen (& 15")
12		Motor, Paper Feed: use 970-0851
13	970-0851	Motor, Paper Feed - 15"
14	970-0838	Arm, Paper Bail (Right) - 15"
15	970-0977	Arm, Paper Bail
16	970-0054	Spring, Paper Bail
17	970-0833	Spring, Paper Bail - 15"
18	970-0638	Cap, Lever Set
19	970-0841	Pulley, Carrier Motor - 15"
20	970-0845	Motor, Carrier - 15"
21	970-0828	Clamp, Carrier Motor - 15"
22	970-0849	Grommet, Carrier Motor, Rubber - 15"
23	970-0822	Screw, Carrier Motor Release - 15"
24	970-0847	Foot, Rubber - 15"
25	970-0853	Pulley, Carrier Holder - 15"
26	970-0837	Pulley, Idler - 15"
27	970-0874	Foot, Rubber Stop - 15"
28	949-0050	Arm, Paper Bail (Left) - 15"
29	970-0630	Motor, Carrier
30	970-0081	Shim, Motor Shaft (& 15")
31	970-0053	Pulley, Motor

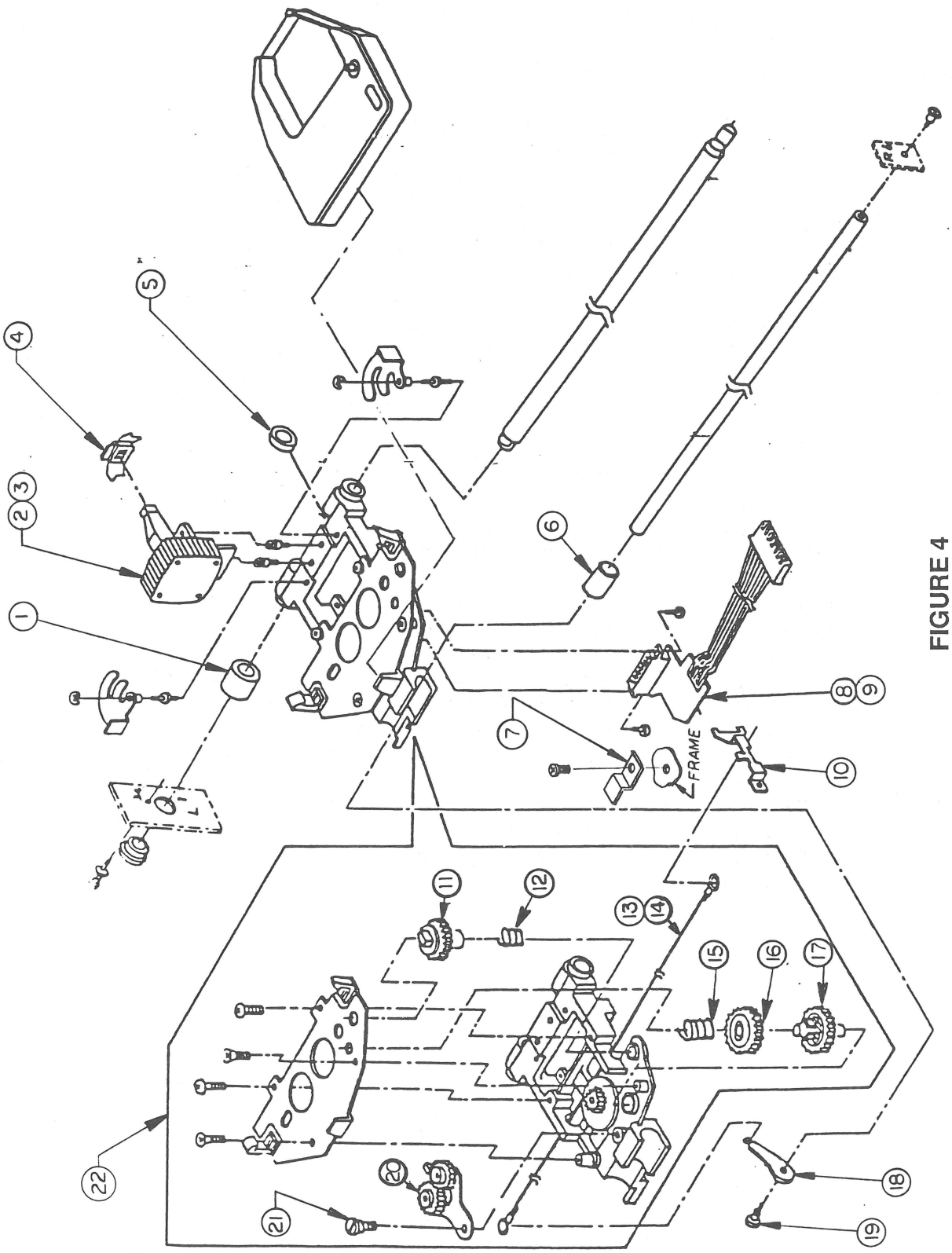

FIGURE 4

❑ PRINT HEAD ASSEMBLY (Figure 4)

Item	Part No.	Description
1	970-0848	Stopper, Carrier - 15"
2	661-0315	Print Head, U.S. (& 15")
3	970-0646	Print Head, Europe (& 15")
4	970-0059	Guide, Ribbon (& 15")
5	970-0067	Wiper, Felt (& 15")
6	970-0842	Bearing, Carrier Assembly - 15"
7	970-0827	Retainer, Connector Cable (& 15")
8	699-0113	Connector Assembly, Head
9	970-0862	Connector Assembly, Head - 15"
10	970-0826	Bracket, Connector Holder (& 15")
11	970-0060	Gear, Ribbon Drive (& 15")
12	970-0064	Spring, Drive Gear (& 15")
13	970-0066	Wire, Ribbon Drive
14	970-0844	Wire, Ribbon Drive - 15"
15	970-0063	Spring, Ratchet Gear (& 15")
16	970-0061	Gear, Ratchet "A" (& 15")
17	970-0062	Gear, Ratchet "B" (& 15")
18	970-0825	Arm, Ribbon Drive Wire (& 15")
19	970-0875	Screw, Shoulder (& 15")
20	970-0065	Gear, Change Arm (& 15")
21	970-0719	Screw, Shoulder (& 15")
22	076-0244	Carrier Frame Assembly

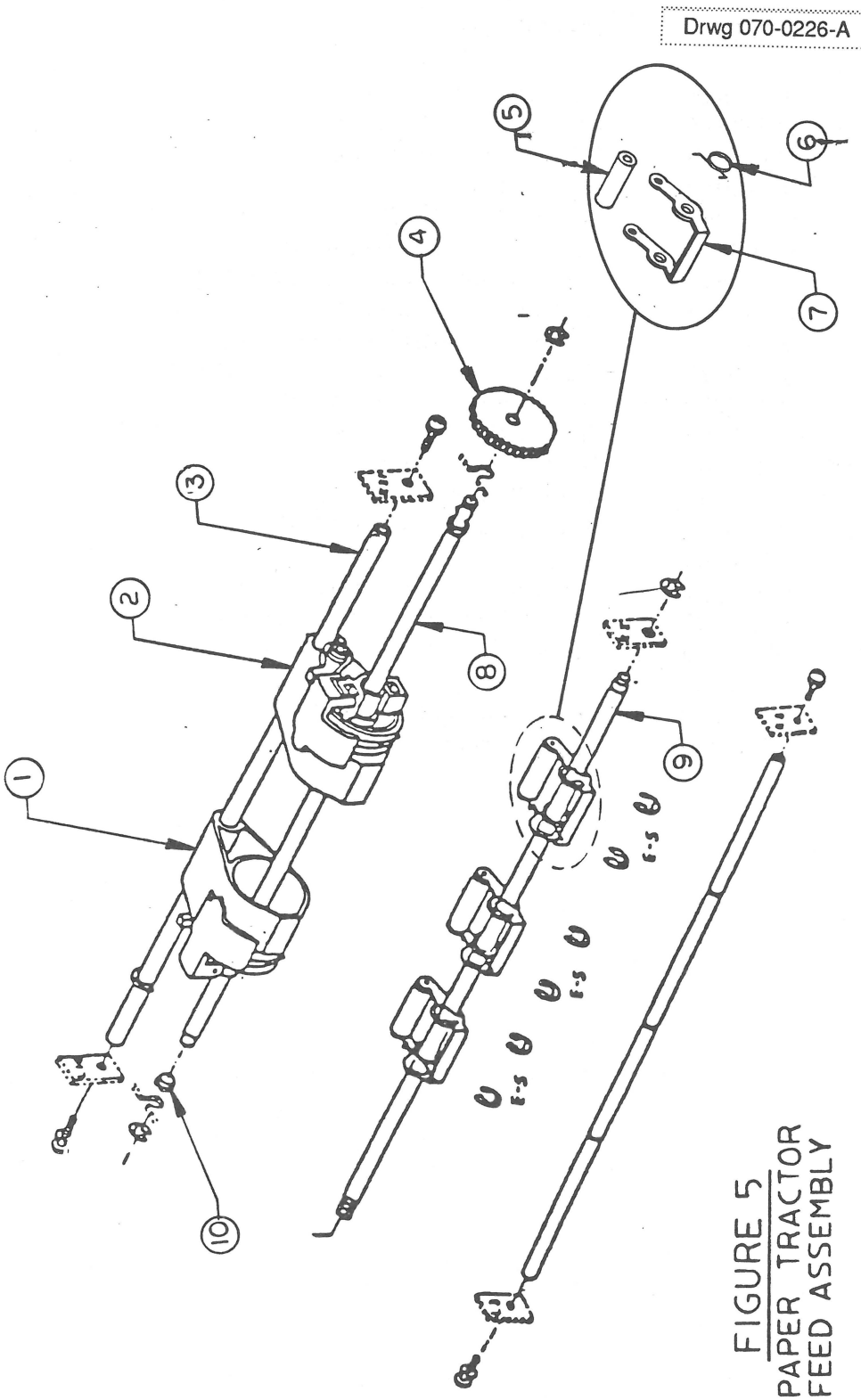

FIGURE 5
PAPER TRACTOR
FEED ASSEMBLY

IMAGEWRITER - PAPER TRACTOR FEED ASSEMBLY (Figure 5)

Item	Part No.	Description
1	970-0631	Sprocket, Left (& 15")
2	970-0632	Sprocket, Right (& 15")
3	970-0819	Shaft, Tractor Feed Support - 15"
4	970-0057	Gear, Tractor Feed (& 15")
5	970-0058	Feed Roller (& 15")
6	970-0055	Spring, Feed Roller (& 15")
7	970-0823	Arm, Feed Roller Support (& 15")
8	970-0820	Shaft, Tractor Feed Drive - 15"
9	970-0821	Shaft, Platen Feed Roller - 15"
10	970-0834	Cam, Feed Roller Shaft (& 15")

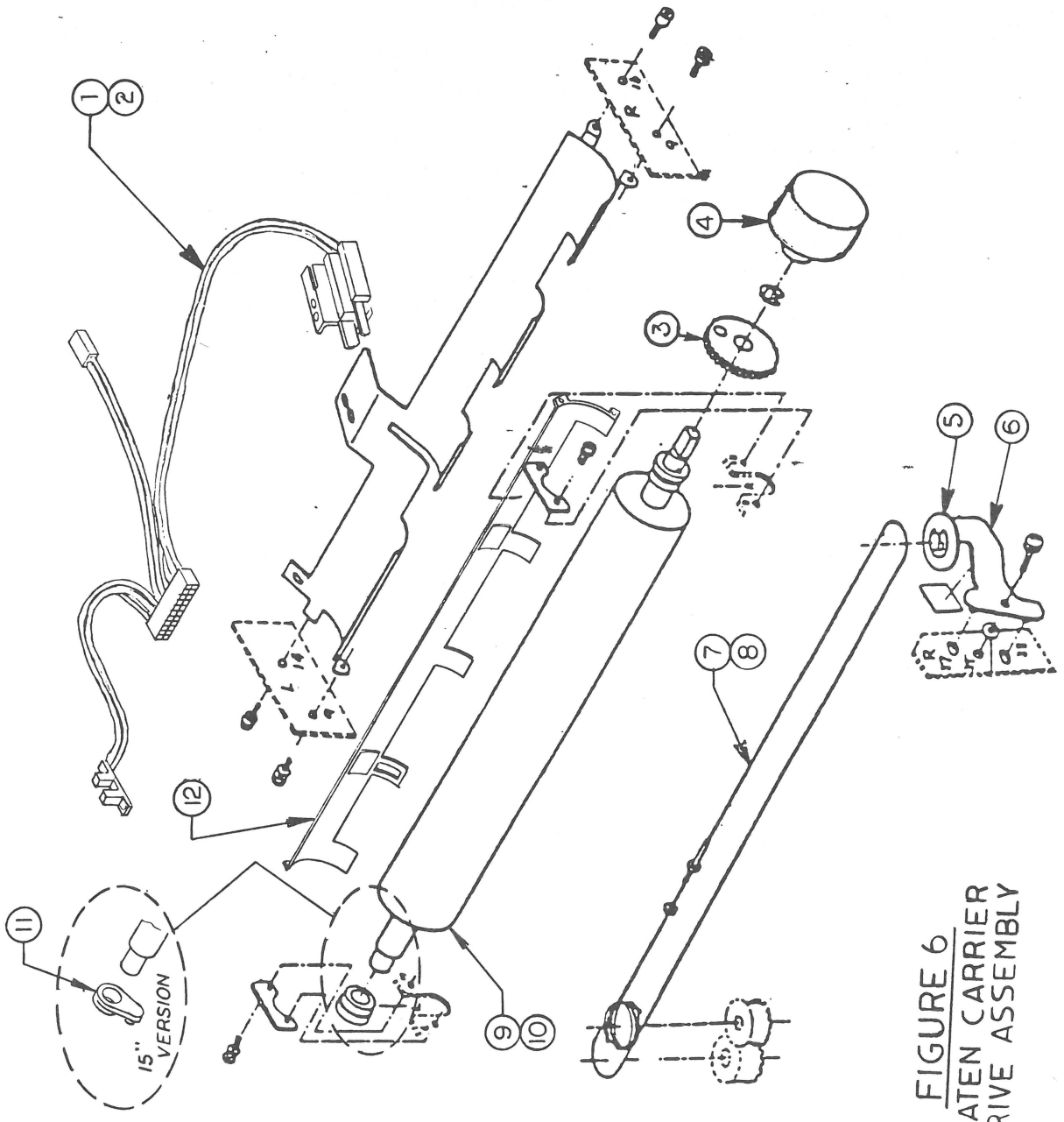

FIGURE 6
PLATEN CARRIER
DRIVE ASSEMBLY

IMAGEWRITER, PLATEN CARRIER DRIVE ASSEMBLY (Figure 6)

Item	Part No.	Description
1	970-0637	Sensor Assembly, OOP/EOT/Cover Interlock
2	970-0864	Sensor Assembly, OOP/EOT/Cover Interlock - 15"
3	970-0069	Gear, Platen (& 15")
4	970-0600	Knob, Platen (& 15")
5	970-0070	Arm, Carrier Wire Tension
6	970-0854	Arm, Carrier Wire Tension - 15"
7	970-0080	Wire, Carrier
8	970-0818	Wire, Carrier - 15"
9	970-0068	Platen Core, Rubber
10	970-0846	Platen Core, Rubber - 15"
11	970-0836	Bearing, Platen Holder - 15"
12	970-0982	Cradle, Platen Guide
	970-0855	Cradle, Platen Guide - 15"

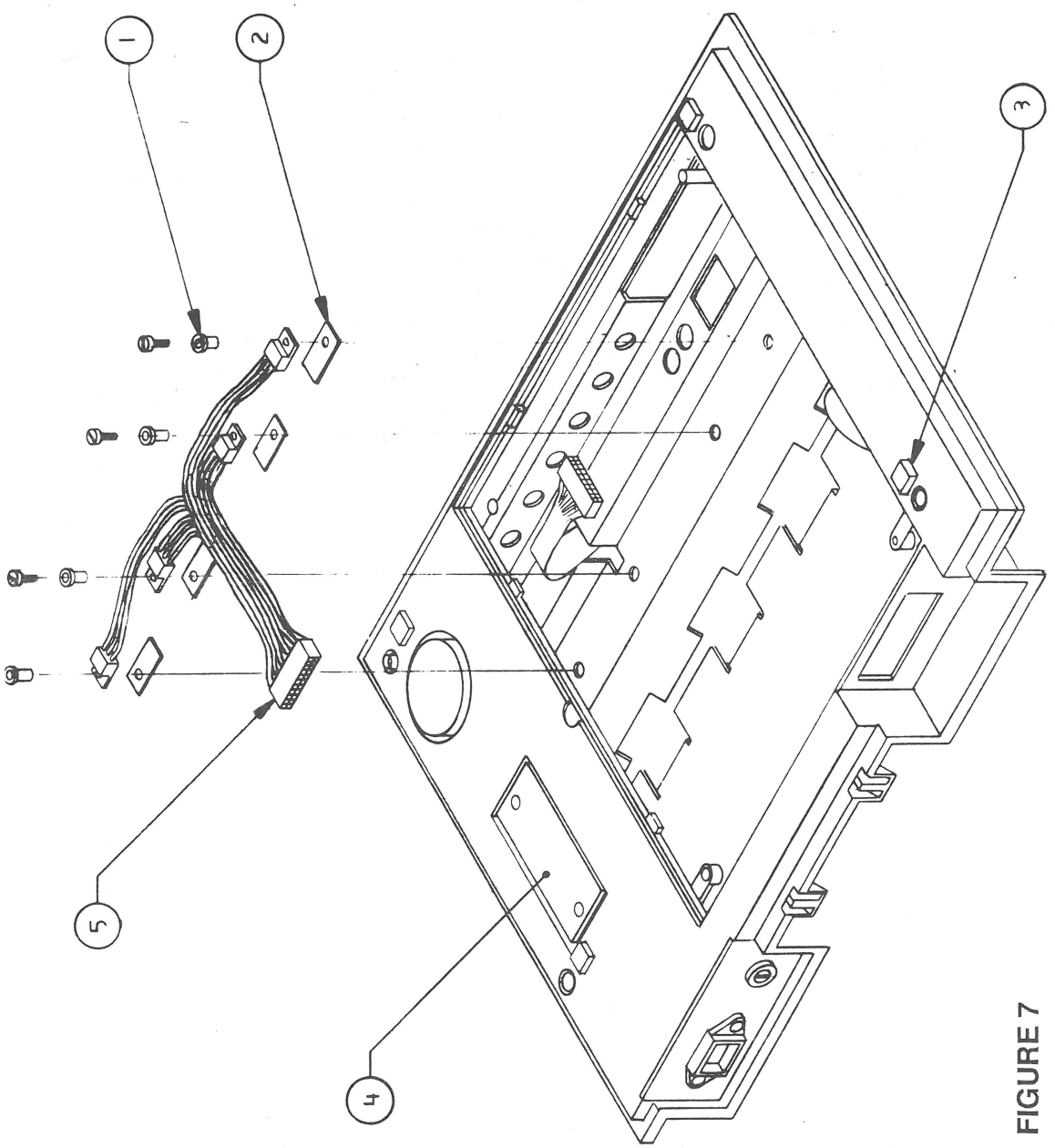

FIGURE 7

IMAGEWRITER - BOTTOM VIEW (Figure 7)

Item	Part No.	Description
1	860-0034	Washer, Shoulder Nylon (& 15")
2	725-0006	Insulator, Silicon Rubber (& 15")
3	970-0714	Foot, Rubber
4	970-0824	Plate, Transformer Cover (& 15")
5	699-0120	Transistor Assembly, Carrier Drive

15 Inch ImageWriter Technical Procedures

Section 5

Take-Apart

Contents:

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Remove and Replace the Switch Panel.....5.3
Remove and Replace the Top Cover.....5.3
Remove the Platen.....5.3
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Remove and Replace the Ribbon Wire.....5.5
Remove and Replace the CPU Board.....5.5
Remove/Adjust and Replace the Dot Head.....5.5
Remove and Replace the Carrier Wire.....5.5
Remove the Mechanical Assembly.....5.5
Replace the Mechanical Assembly.....5.7
Remove the Carrier Motor.....5.9
Replace the Carrier Motor.....5.13
Remove and Replace the Transformer.....5.15

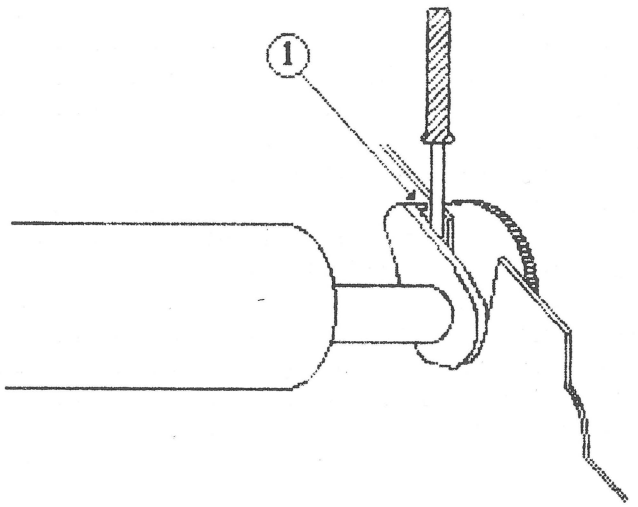

FIGURE 1

INTRODUCTION

The 15 inch ImageWriter is an extended carriage version of the standard ImageWriter printer. It differs only in the length of the following parts:

carriage,
platen,
carrier wire,
ribbon wire, and
dot head cable.

Replacement of the carrier wire and motor, platen removal, and removal of the mechanical assembly are slightly different from the standard ImageWriter procedures.

Some parts of this section will refer you to section 2 for procedures that are the same on both the ImageWriter and the 15 inch ImageWriter.

A. REMOVE AND REPLACE THE SWITCH PANEL - Refer to Section 2.

B. REMOVE AND REPLACE THE TOP COVER - Refer to Section 2.

C. REMOVE AND REPLACE PLATEN

Use these procedures instead of the procedures in Section 2.

For these procedures you will need:

1/8 inch flat-blade screwdriver

Remove:

1. Remove the power cord and the top cover (see Section 2B).

2. Pull the paper bail forward.

3. Pry the platen shaft holder (see Figure 1, #1) out from the carriage hole with a small screwdriver. Repeat for the holder at the other end.

4. The platen can now be removed by lifting it straight up.

NOTE: The platen can be cleaned by wiping with "Fedron" or "R41", available at printer supply houses.

CAUTION: Fedron and R41 emit harmful vapors and must be used only in a well ventilated space. Close containers when not in use. Do not use platen cleaner on plastic parts.

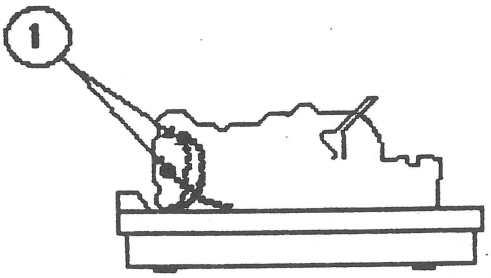

FIGURE 1

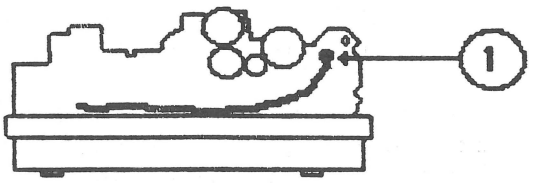

FIGURE 2

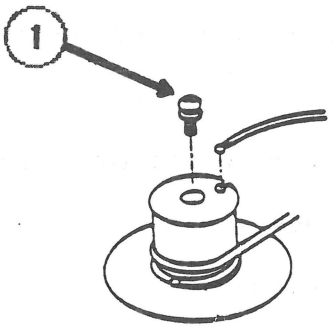

FIGURE 3

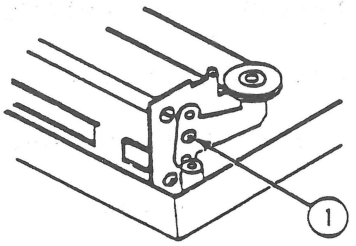

FIGURE 4

Replace:

1. Slide the platen down into the chassis.
2. Replace the right and left platen shaft holders.

D. REMOVE AND REPLACE THE RIBBON WIRE - Refer to Section 2.

E. REMOVE/REPLACE THE CPU BOARD - Refer to Section 2.

F. REMOVE/REPLACE AND ADJUST DOT HEAD - Refer to Section 2.

G. REMOVE/REPLACE THE CARRIER WIRE - Refer to Section 2.

H. REMOVE AND REPLACE THE MECHANICAL ASSEMBLY

Use these procedures instead of the procedures in Section 2

For these procedures you will need:

#2 Phillips screwdriver
7 mm Nutdriver
Pulley remover
1/4" flatblade screwdriver

Remove

1. Disconnect the power cord.
2. Remove the paper cover and carrier cover.
3. Remove the CPU board (Section 2E).
4. Remove the top cover (Section 2B).
5. Remove the two screws securing the ground wires to the left end of the chassis (see Figure 1, #1).
6. Remove the ground wire from the right end of the chassis (see Figure 2, #1).
7. Remove the two screws at the base of the power switch housing and set the housing aside.
8. Use a Phillips screwdriver to remove the screw from the top of the motor pulley (see Figure 3, #1).

   NOTE: The pulley can be stopped from turning by holding the carrier in place.
9. Loosen the screw on the tension arm at the right end of the mechanical assembly (see Figure 4, #1).

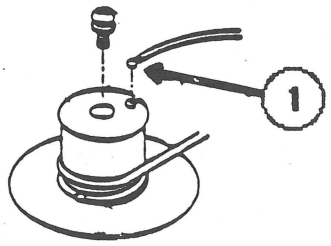

FIGURE 5

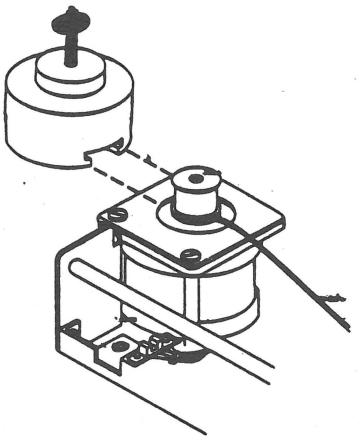

FIGURE 6

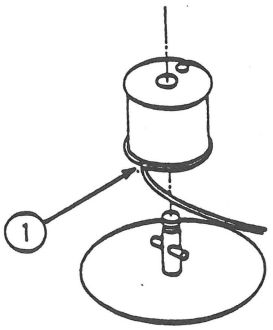

FIGURE 7

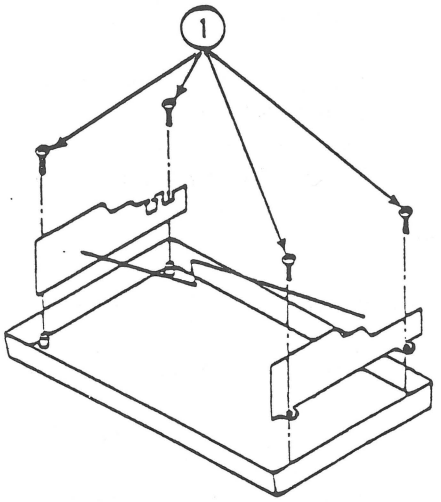

FIGURE 8

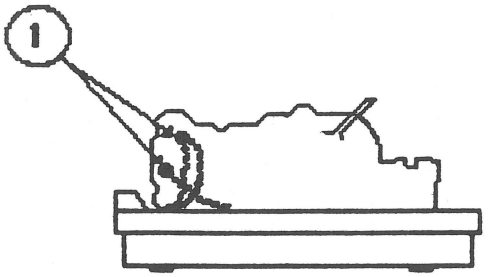

FIGURE 9

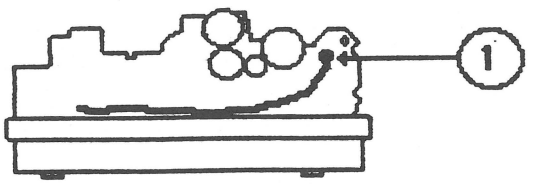

FIGURE 10

10. Slip the carrier wire off the pulleys at both ends of the carriage.

11. Remove the top end of the carrier wire (see Figure 5, #1).

12. Use the pulley remover to take off the motor pulley. Slide the pulley remover onto the top of the pulley and turn the screw clockwise until the pulley is free (see Figure 6).

13. Unwind the carrier wire.

14. Remove the bottom end of the carrier wire from the motor pulley (see Figure 7, #1).

15. To free the mechanical assembly, remove the four screws holding it to the bottom cover (see Figure 8, #1).

16. Lift the mechanical assembly out of the bottom cover.

Replace

1. Put the mechanical assembly back into the bottom cover. Make sure that the rubber washers and inserts are installed.

2. Replace the four screws that secure the mechanical assembly (see Figure 8, #1).

3. Replace the two screws and ground wires (see Figure 9, #1) at the left end of the chassis.

4. Replace the ground wire at the right end of the chassis (see Figure 10, #1).

5. Move the carrier to the center and wrap the carrier wire (the long end) around the right hand pulley.

6. Work this end of the wire under the carrier assembly until it reaches the left hand side of the printer.

7. Insert the end of the wire into the bottom slot on the motor pulley (see Figure 7, #1).

8. Seat the motor pulley on the shaft.

9. Hold the wire snug against the motor pulley with your thumb. Turn the pulley in a clockwise direction and wind up the carrier wire.

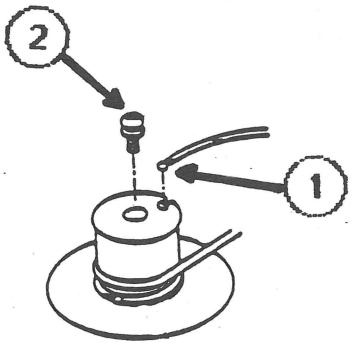

FIGURE 11

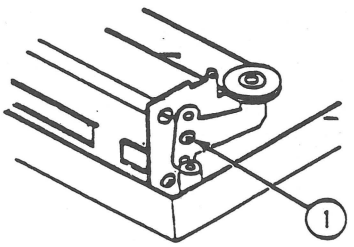

FIGURE 12

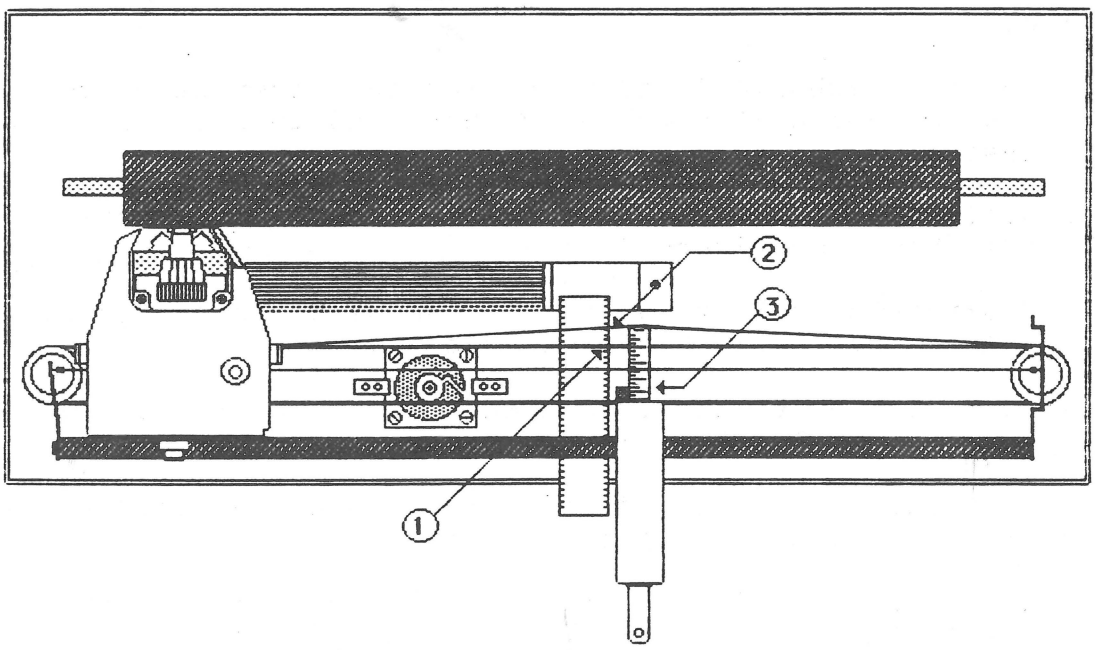

FIGURE 13

10. Wrap the other end of the carrier wire around the pulley on the left.

11. Insert this end of the wire into the top slot of the motor pulley (see Figure 11, #1).

12. Wrap the wire around the pulley in a clockwise direction.

13. Replace the motor pulley screw (see Figure 11, #2).

14. Tighten the tension screw until the wire is taut (see Figure 12, #1).

15. Lay a ruler under the carrier wire and visually mark the point where the rear carrier wire crosses the ruler (see Figure 13, #1). With the carriage assembly at the far left, push the carrier wire at its center with a tension gauge.

16. When the wire has been pushed 3/8 inch away from its original position (see Figure 13, #2), check the tension gauge (see Figure 13, #3). It should read 1 pound (lb.). If it doesn't, adjust the screw of the tension arm and recheck.

17. Replace the power switch housing.

18. Replace the top cover.

19. Replace the CPU board (see Section 2E). **NOTE:** Make sure to pull the slack out of the dot head cable before seating the CPU board.

20. Replace the carrier cover and paper cover.

21. Load paper and ribbon cartridge.

22. Power on and perform the self-test.

I. REMOVE AND REPLACE THE CARRIER MOTOR

Use these procedures instead of the procedures in Section 2.

For these procedures you will need:

1/4 inch flat blade screwdriver
#2 Phillips screwdriver
Pulley remover
7mm nutdriver
Tension gauge
Ruler

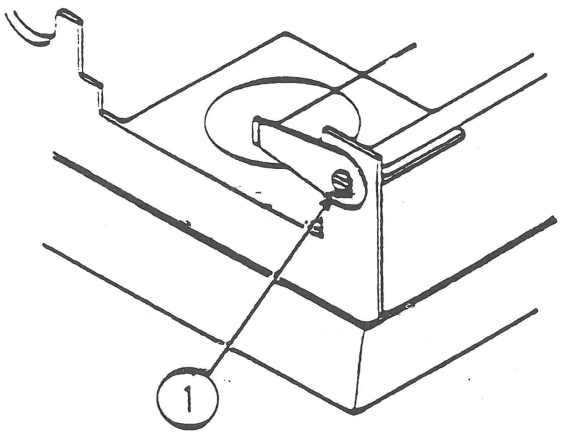

FIGURE 1

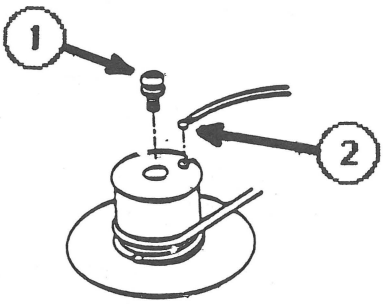

FIGURE 2

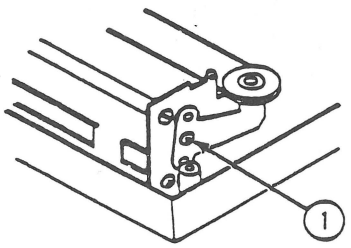

FIGURE 3

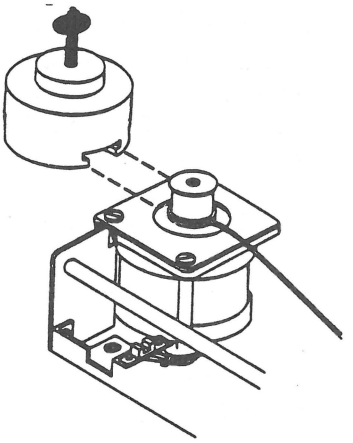

FIGURE 4

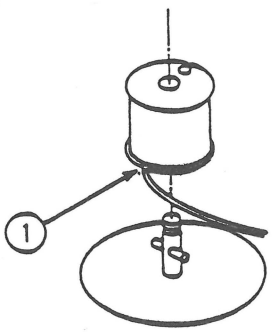

FIGURE 5

Remove:

1. Remove the power cord.

2. Remove the carrier cover and the paper cover.

3. Remove the motor cable from the CPU board (refer to Section 2E if necessary).

   NOTE: The CPU board does not need to be completely removed. The purpose of this step is to disconnect the motor cable from the CPU board. With the printer resting on its back edge and the solder side of the CPU board facing you, the motor cable is located at the upper left corner of the CPU board.

4. Remove the top cover (refer to Section 2B if necessary).

5. Loosen the ribbon wire tension arm (see Figure 1, #1) at the left end of the carriage.

6. Free the ribbon wire from the two ribbon wire posts.

7. Tie the wire in a loose knot over the carrier and move the carrier all the way to the left.

8. Use a Phillips screwdriver to remove the screw from the top of the motor pulley (see Figure 2, #1).

   NOTE: The pulley can be stopped from turning by holding the carrier in place.

9. Loosen the screw on the carrier wire tension arm (see Figure 3, #1) at the right end of the carriage.

10. Slip the carrier wire off the pulleys at both ends of the carriage.

11. Remove the top end of the carrier wire from the top slot of the pulley (see Figure 2, #2).

12. Unwind the carrier wire.

13. Slide the pulley remover onto the top of the pulley (see Figure 4) and turn the screw clockwise until the pulley is free.

14. Remove the bottom end of the carrier wire from the motor pulley (see Figure 5, #1).

15. Remove the two motor clamps located on either side of the motor.

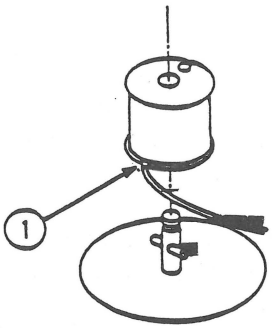

FIGURE 6

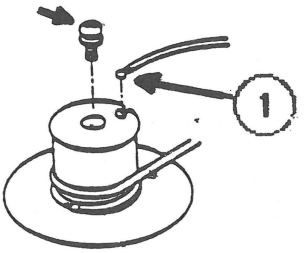

FIGURE 7

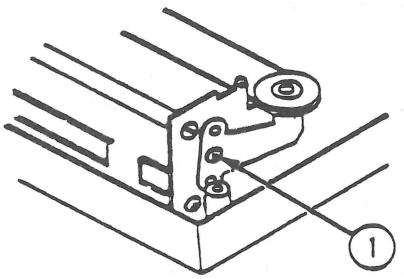

FIGURE 8

16. Use a flatblade screwdriver to remove the four motor mounting screws

17. Lift up the motor with one hand and work the motor cable free with the other hand.

Replace:

1. From the front side of the mechanical assembly, put the motor in its slot. Make sure that the rubber inserts are in the motor mounting holes and that the motor cable comes forward and then bends to the right toward the CPU board.

2. Replace the four motor mounting screws and the two motor clamps.

3. Wrap the carrier wire around the right hand pulley.

4. Work this end of the wire under the carrier assembly until it reaches the left hand side of the printer.

5. Insert the end of the wire into the bottom slot on the motor pulley (see Figure 6, #1).

6. Seat the motor pulley on the shaft.

7. Hold the wire snug against the motor pulley with your thumb. Turn the pulley in a clockwise direction and wind up the carrier wire.

8. Wrap the other end of the carrier wire around the pulley on the left.

9. Insert this end of the wire into the top slot of the motor pulley (see Figure 7, #1).

10. Wrap the wire around the pulley in a clockwise direction.

11. Replace the motor pulley screw (see Figure 7, #2).

12. Tighten the tension screw until the wire is taut (see Figure 8, #1).

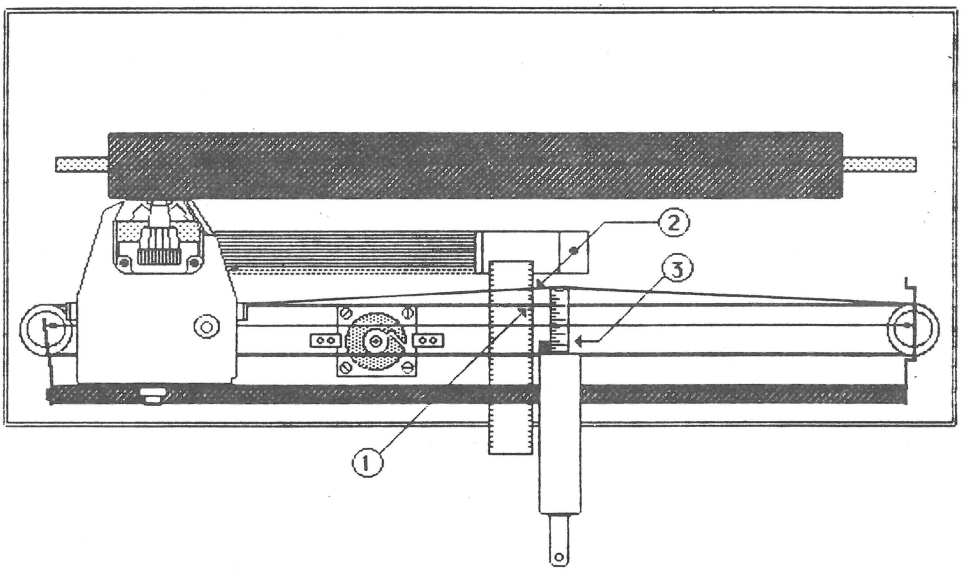

FIGURE 9

13. With the carrier pushed all the way to the left, lay a ruler under the carrier wire (see Figure 9, #1) and visually mark the point where the rear carrier wire crosses the ruler.

14. Push the rear carrier wire at its center until it has been pushed 3/8 inch away from its original position (see Figure 9, #2), check the tension gauge (see Figure 9, #3). It should read 1 pound (lb.). If it doesn't, adjust the screw of the tension arm and recheck.

15. Attach the ribbon wire to the ribbon wire posts. If the wire comes off the pulley, refer to Section 2D of the ImageWriter Technical Procedures.

16. Tighten the ribbon wire arm.

17. Connect the motor cable to the CPU board and replace the four CPU board screws.

18. Replace the bottom panel and its four screws.

19. Replace the top cover (make sure the interlock switch on the left is connected), carrier cover, and paper cover.

20. Power on and run the self test.

J. REMOVE AND REPLACE THE TRANSFORMER - Refer to **Section 2.**

ImageWriter Technical Procedures

Section 6

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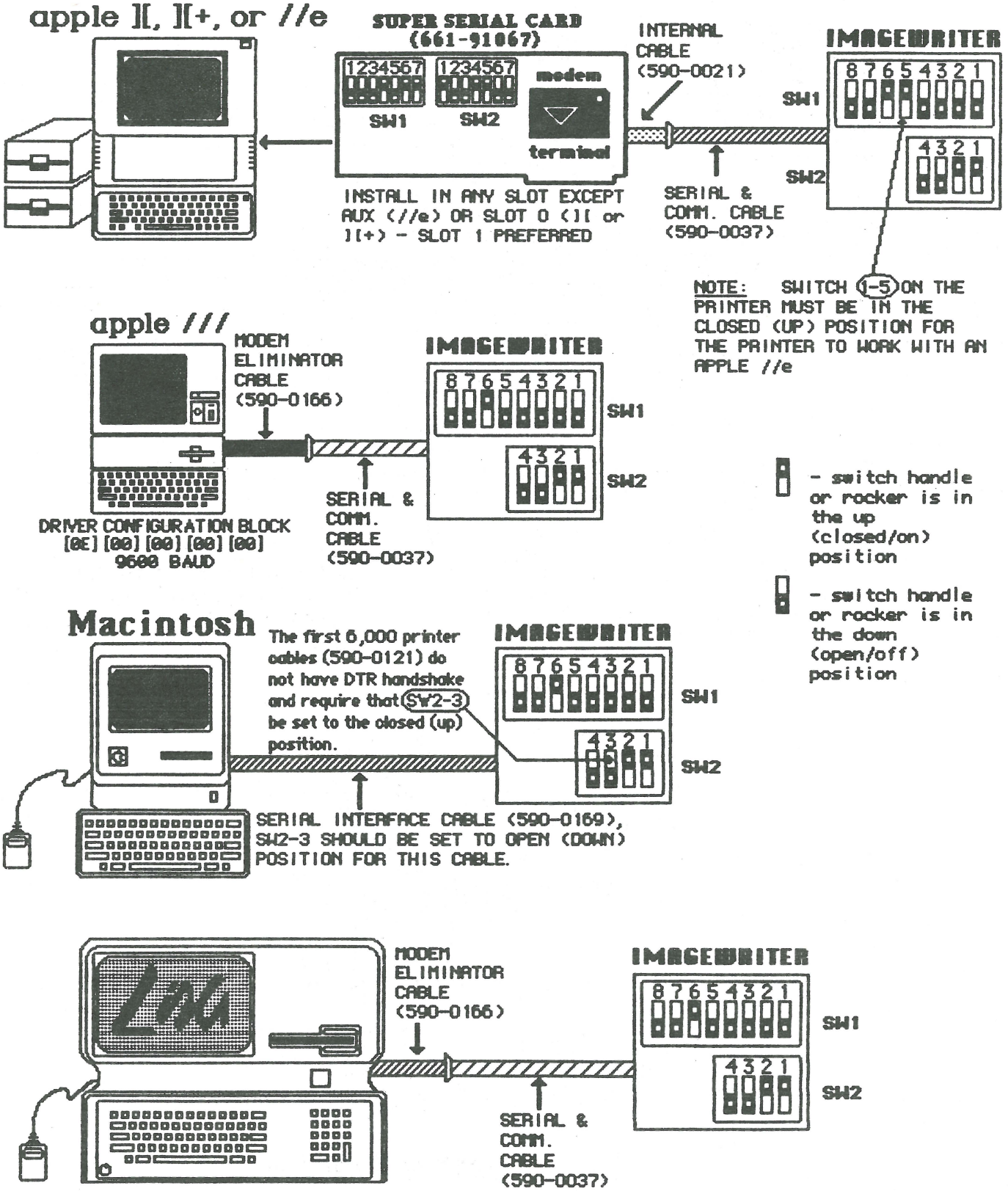
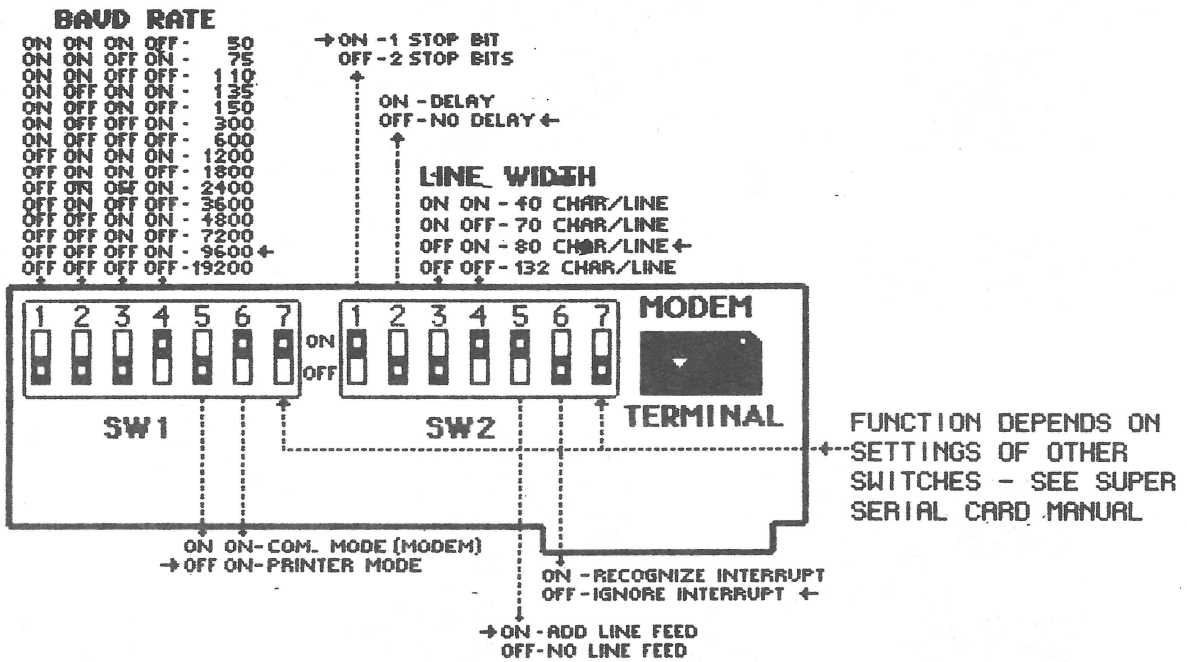
Imagewriter Configuration

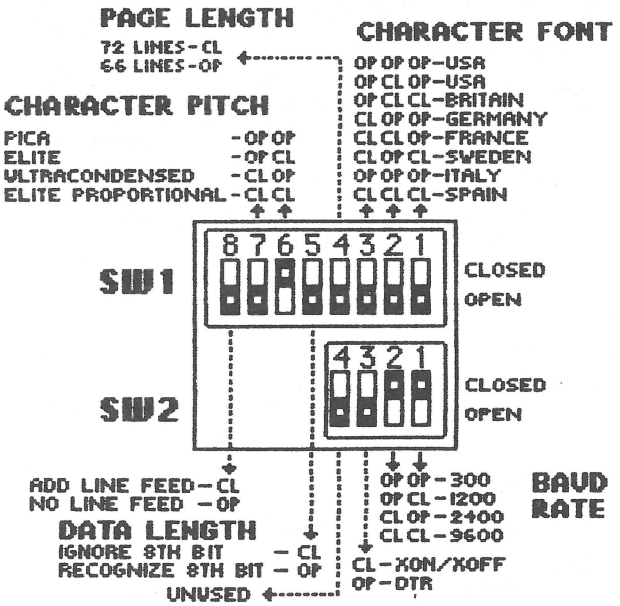


DIP SWITCH FUNCTIONS #1



Super Serial Card

switches are shown in most commonly used positions (exception: For Apple //e, Imagewriter switch 1-5 should be set to closed position)



Imagewriter Printer

Apple Technical Procedures

ImageWriter II

Technical Procedures

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SheetFeeder Illustrated Parts List

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Apple Technical Procedures

ImageWriter II

Section 1 – Basics

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❑ INTRODUCTION

The ImageWriter® II printer is an improved version of the ImageWriter. The following two lists discuss the new features of the ImageWriter II and its differences from the original ImageWriter.

New Features

ImageWriter II

Multiple Fonts

Draft—240 characters per second
Standard—180 characters per second
Near Letter Quality—25 characters per second

Auto Paper Load

Automatically loads paper when the form-feed button is pressed.

Color Capability

Provides color-option printing with a four-color ribbon.

Sheet Feeder

Accepts a single-bin sheet feeder.

Option Card

Will accept one of the two option cards available—the AppleTalk card or the Expanded Buffer card.

MouseText

The character set contains 32 special characters for use on Apple II computers.

Self-Identification

The printer automatically determines its operational mode by checking to see if there is a color ribbon, a sheet feeder, or an option card installed.

New DIP Switches

The Option Card Enable function is switch 2-4. The Perforation Skip is switch 1-5.

Changed Features

	ImageWriter	ImageWriter II
Interface Port	RS-232	RS-422/423
7/8 Bit Protocol	Hardware selection. DIP switch 1-5.	Software control only. No DIP switch control.
Head Dot Diameter	Wire diameter is .35 mm.	Wire diameter is .30 mm. Placement of dots is 50% more accurate.
Speed	Print mode is 120 characters per second.	Print mode is 180 characters per second.
Deselect Action	The entire buffer is printed before stopping.	At the most, 2 more lines are printed before the printer stops.
Tractor Feed Disengagement	Paper must be removed from tractors.	If you select the friction-feed mode, tractors are automatically disengaged.
Paper Bail	Must be pulled away from the platen to load paper.	Automatically loads paper.
Printing Area	Requires a 3-line top margin.	Entire length of paper.
Vertical Paper	Feeds paper at 1.67 inches per second.	Feeds paper at 4.0 inches per second.

❑ SETUP

Power On and Off

1. Connect the power cord to the printer.
2. Plug the power cord into an electrical outlet.
3. Press the power switch on.
4. Check the switch panel. Make sure the power light comes on.
5. Press the power switch off.

Load Paper

1. Make sure the power is off.

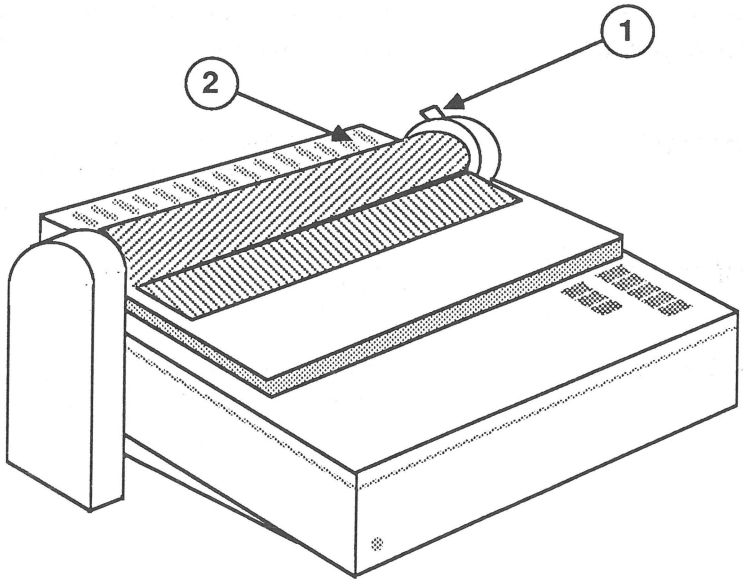


FIGURE 1

2. Pull the paper release lever forward (Figure 1, #1).
3. Lift up and remove the tractor cover (Figure 1, #2).

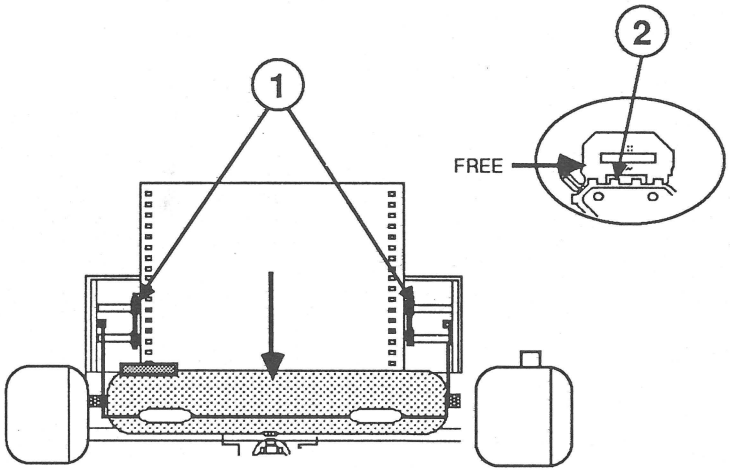


FIGURE 2

4. Lift up the clamps on both forms tractors (Figure 2, #1).

5. Make sure that the left forms tractor is positioned all the way to the left. (To move the forms tractor, pull the tractor release lever [Figure 2, #2] forward.) Lock the forms tractor in place by pushing back the tractor-release lever.

6. Place the paper over the forms tractor pins. If the paper doesn't line up with the pins, move the right forms tractor until it does. Lock the right forms tractor in place.

7. Push down the clamps on both of the forms tractors.

8. Turn the platen knob until the paper comes through.

9. Put the back cover on.

Remove Paper

1. Make sure the power is off.

2. Check to be sure the release lever is set to tractor feed.

3. Turn the platen knob and back the paper out.

Load the Ribbon Cartridge

1. Make sure the power is off.

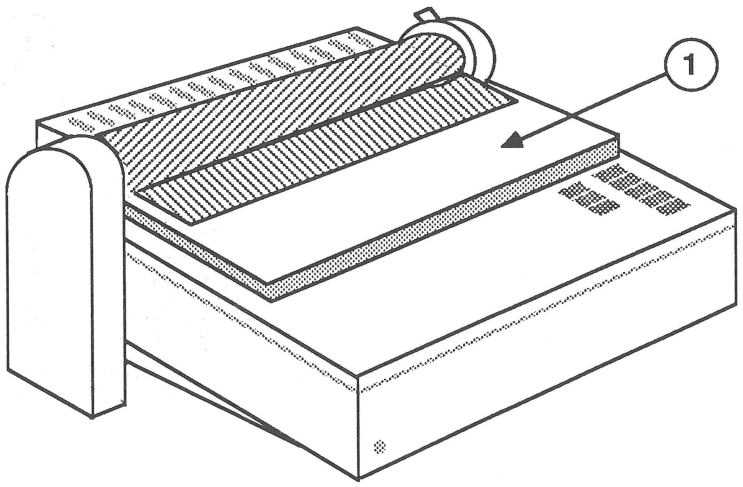


FIGURE 3

2. Lift up and remove the paper cover (Figure 3, #1).
3. Get a ribbon cartridge.
4. Place the cartridge on the ribbon plate.

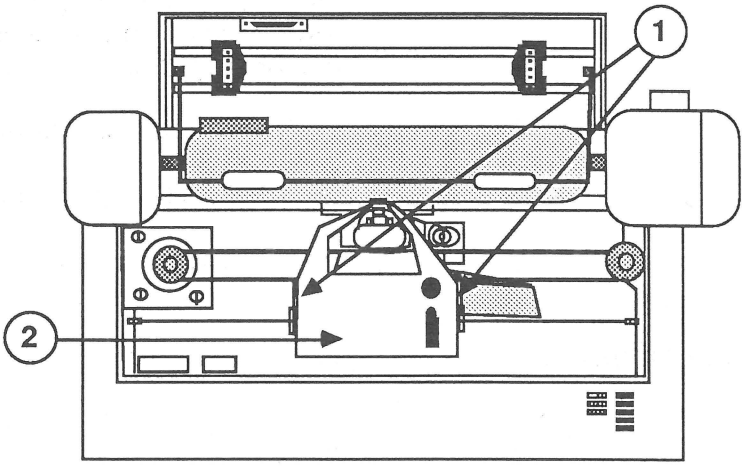


FIGURE 4

5. Push down on the cartridge until it snaps into place (see Figure 4, #2).

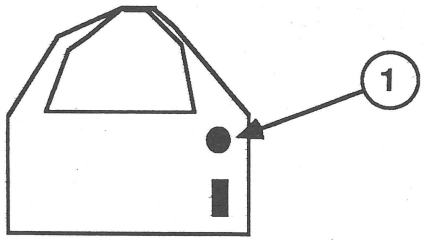


FIGURE 5

6. On the cartridge, turn the knob (see Figure 5, #1) clockwise until you hear it "click" and the ribbon is taut.

7. Replace the paper cover.

   Note: Be sure to replace the paper cover before attempting to operate the printer. The printer will not print without the paper cover in place.

Remove the Ribbon Cartridge

1. Make sure the power is off.

2. Lift up and remove the paper cover (Figure 3, #1).

3. While pushing down on the cartridge latch arms (Figure 4, #1), lift up the cartridge (Figure 4, #2).

❑ SELF-TEST

1. Make sure the power is off.

2. Load the paper.

3. To run the self-test, press and hold down the form-feed switch on the switch panel while you turn the power on. Then release both switches.

   The first part of the printout will show the ROM revision number and the DIP switch settings and will indicate whether either option card is installed. After that, the printout will show lines of characters. Each line will contain the letters of the alphabet, the numbers 0 through 9, and a series of special characters.

   Note: If you are using a colored ribbon, the test printout will alternate the colors available for each line printed.

4. To end the test, turn the power off.

   Note: If the select button is accidentally depressed during power-up, the next data that is sent to the ImageWriter will be a hexadecimal dump. If this problem occurs, power the ImageWriter off and then back on. The printer will power up in the proper mode.

❑ CONFIGURATION DIP SWITCHES

Configuration DIP switches provide variations in the ways the printer may be operated. For additional information on switch settings, refer to the *Peripheral Interface Guide.*

Materials Required

Jeweler's flatblade screwdriver

Setting the Switches

1. Make sure the power is off.
2. Remove the paper cover.

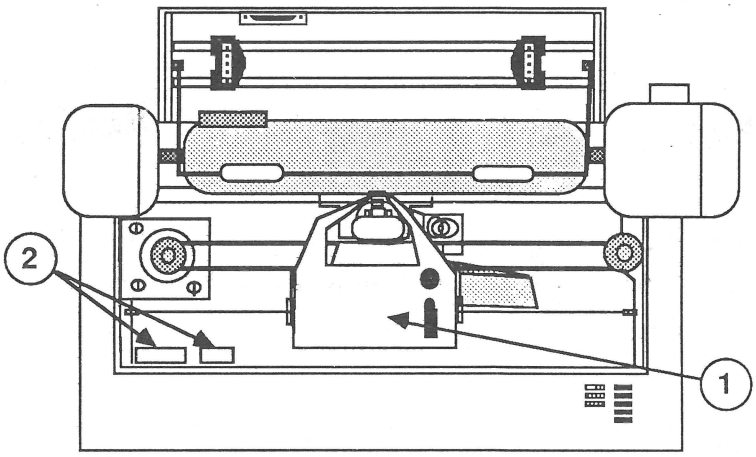


FIGURE 6

3. Slide the carrier all the way to the right (Figure 6, #1).
4. Locate switches SW 1 and SW 2 (Figure 6, #2).

   Note: SW 2-5 and SW 2-6 are used only when performing the firing hammer adjustment (refer to Section 4, Adjustments).

5. Use a small screwdriver to move the switch handles as desired.

6. Replace the paper cover.

7. Run the self-test.

❑ PERIODIC MAINTENANCE

Clean the printer as often as required. Lubricate it once a year, or more often if it is being used heavily. To perform maintenance tasks:

1. Make sure the power is off.

2. Remove the tractor cover and the paper cover.

3. Remove the paper and ribbon cartridge.

   Note: For the next two steps, refer to Section 3, Take-Apart, for complete instructions on removing the carrier assembly and carrier shaft.

4. Using gauze or absorbent cotton, wipe the dirt off of the carrier shaft.

5. Apply four drops of tellus lubrication oil to each of the felt wipers, which are located under the carrier assembly.

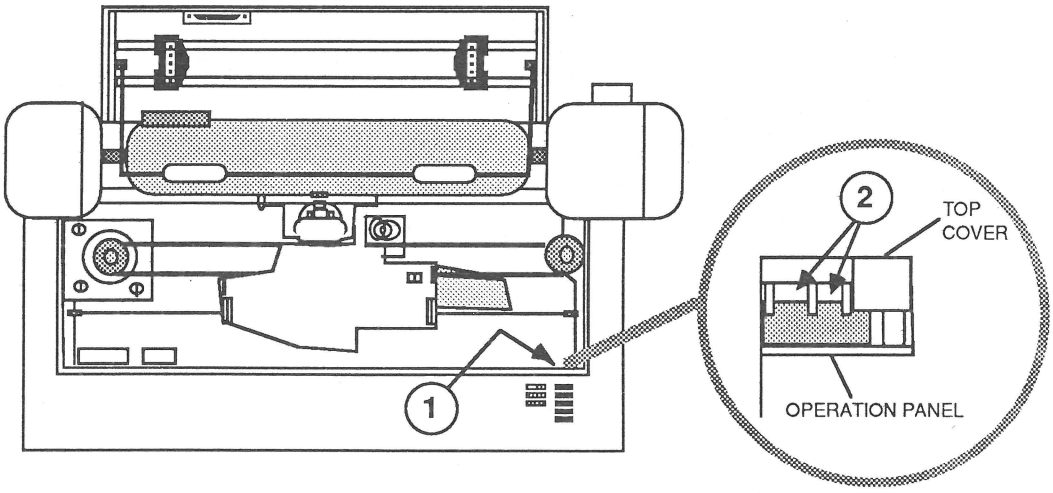


FIGURE 7

6. Find the detector plate. It is on the right side of the printer, hidden just below the on/off switch (Figure 7, #1).

7. Use a brush to remove any paper dust (Figure 7, #2).

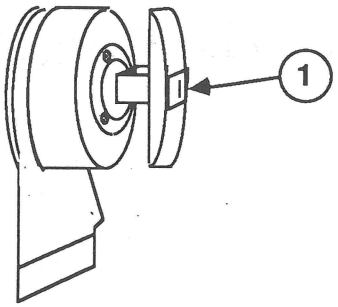


FIGURE 8

8. Clean the dot head (Figure 8, #1) with a lint-free cloth and a low-residue cleaner such as isopropyl alcohol or Freon.

9. Replace the ribbon cartridge.

10. Perform the self-test to verify optimum printing performance.

Maintenance Schedule

The following table summarizes the manufacturer's recommended maintenance intervals:

OPERATOR — As required	DEALER SERVICE — As required during preventive or corrective maintenance	DEALER SERVICE — Once every year or about 500,000 lines of print	DEALER SERVICE — Once every 2 years or about 1,000,000 lines of print	
	X	X		Clean and lubricate carrier shaft
		X		Lubricate platen sleeve bearings
		X		Lubricate tractor sleeve bearings
	X	X		Clean dot head
	X	X		Clean detector plate
			X	Check motor mounting screws for looseness
X	X	X		Clean platen, feed rollers, and paper bail rollers
X	X	X		Check print quality

❑ THEORY OF OPERATION

Introduction

Troubleshooting can be approached in different ways; Apple usually recommends both module swapping and logical troubleshooting. But random module swapping is impractical for printers because they have so many parts. So, to troubleshoot the ImageWriter II, you will usually want to use the logical troubleshooting method. A description and diagram of the flow of information in the ImageWriter II are given below as aids to this method.

Before You Begin

Before you begin to troubleshoot the ImageWriter II, attempt to run the self-test before you connect the printer to a computer. Then, if the self-test does not run correctly, you can observe where it stops working. Knowing the flow of information, you will be able to isolate the problem to the faulty module.

Flow of Information

Figure 9 is a block diagram of an ImageWriter II printer. The numbers on the diagram indicate the order in which the self-test takes place and correspond to the following descriptions.

1. The AC power cord is plugged into a wall socket and into the power inlet on the right support leg.

2. The power switch on the operation panel is turned on and the form feed switch is held down. The AC voltage and current are passed through the filter to reduce radio frequency interference (RFI) to FCC standards. The 120 volts are sent to the transformer, where they are reduced to 40 volts.

3. The 40 volts are sent to the drive PCB. Here the voltage is broken down and sent to the various parts that need it. The drive PCB contains the power supply and all of the motor and print head drive circuitry. The drive circuitry controls the firing of the hammer and limits the current to the print head.

4. The necessary voltages are sent to the logic board, and the startup sequence (stored in ROM on the logic board) is accessed. The logic board sends startup instructions to the drive PCB.

5. The drive PCB accesses the carrier motor. The carrier motor centers the carrier assembly and moves it back and forth when printing.

6. The form-feed switch is released, notifying the main CPU board that the self-test is to be performed.

7. The main CPU board notifies the drive PCB that the self-test is to be performed. The drive PCB notifies the carrier motor.

8. The drive PCB takes the self-test information and sends it to the print head PCB mounted underneath the carrier assembly.

9. The print head PCB activates the print head and the self-test is performed. The printer will continue to run the self-test until powered off.

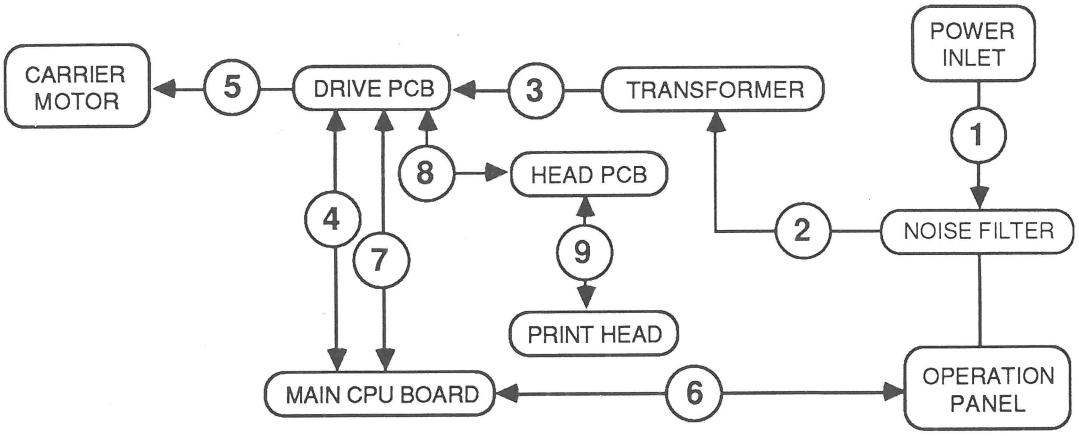


FIGURE 9

Apple Technical Procedures

ImageWriter II

Section 2 – Take-Apart

❑ CONTENTS

2.2 Top Cover
2.4 Operation Panel
2.6 Option Card
2.8 Main CPU PCB
2.10 Print Head
2.12 Color Ribbon Assembly
2.14 Ribbon Wire and Ribbon Assembly
2.18 Flexible Ribbon Cable
2.20 Ribbon Motor Assembly
2.22 Left Support Leg
2.24 Right Support Leg
2.26 Bottom Cover
2.31 Fuses
2.32 Transformer
2.33 Drive PCB
2.34 Mechanical Assembly
2.36 Noise Filter PCB Assembly
2.38 Carrier Motor and Carrier Belt
2.40 Carrier Block Assembly and Print Head PCB
2.46 Platen and Platen Assembly
2.52 Paper-Feed Motor
2.54 Paper Guide
2.56 Paper-Out Sensor
2.58 Tractor Assembly

Note: To keep track of where cables and connectors go during a take-apart procedure, label them using numbered adhesive dots.

WARNING: *For all take-apart procedures, the printer should be off and the AC power cord should be disconnected.*

❑ TOP COVER

Materials Required

#2 Phillips screwdriver

Remove

1. Remove the paper cover and ribbon cartridge.
2. Push the carrier assembly to the far left.

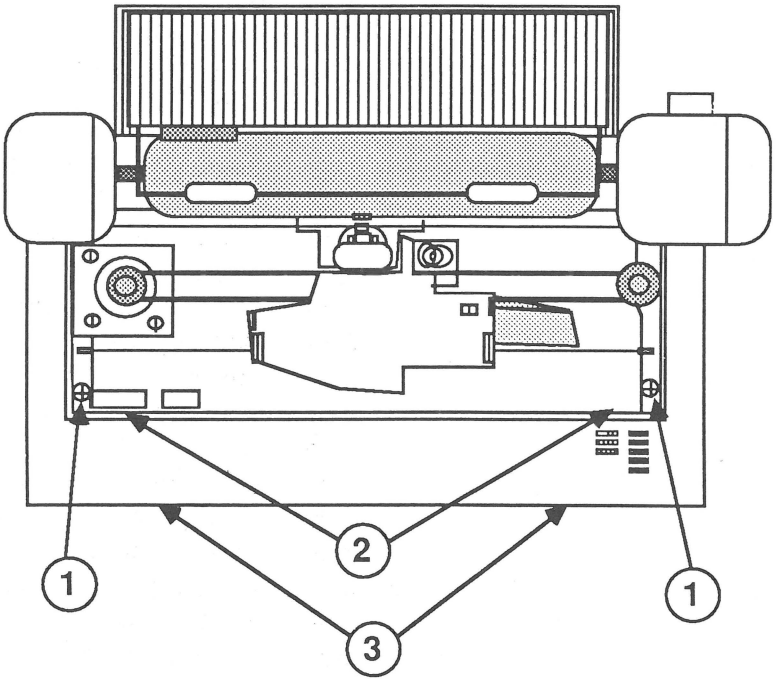


FIGURE 1

3. Loosen the two screws (Figure 1, #1) as far as they will go.
4. Place your fingers over the edge designated by Figure 1, #2, and place your thumbs at the location designated by Figure 1, #3. Gently pull the cover up and toward you until it snaps free. **Do not yet remove the cover.**
5. Lift the right side of the cover to gain access to the connector.

6. Unplug the connector that runs from the control panel board to the main CPU PC board. Remove the connector from the main CPU PC board.

7. Remove the top cover.

Replace

1. Push the carrier assembly to the left.

2. Lay the cover in place and lift the right side. Plug in the connector to the main CPU PC board.

3. Tilt the cover toward you till the front edge is in place.

4. Push down the cover. You will hear a "snap" as it goes into place.

5. Tighten the two screws (Figure 1, #1).

6. Replace the ribbon cartridge and the paper cover.

7. Perform the self-test.

❑ OPERATION PANEL

Materials Required

#2 Phillips screwdriver
Small Phillips screwdriver

Remove

1. Remove the paper cover.
2. Remove the top cover.
3. Remove the four screws holding the operation panel (Figure 2, #1).
4. Lift the operation panel from the top cover. Remove the power button and spring (Figure 2, #2).
5. Unplug the cable from the switch assembly panel (Figure 2, #3).

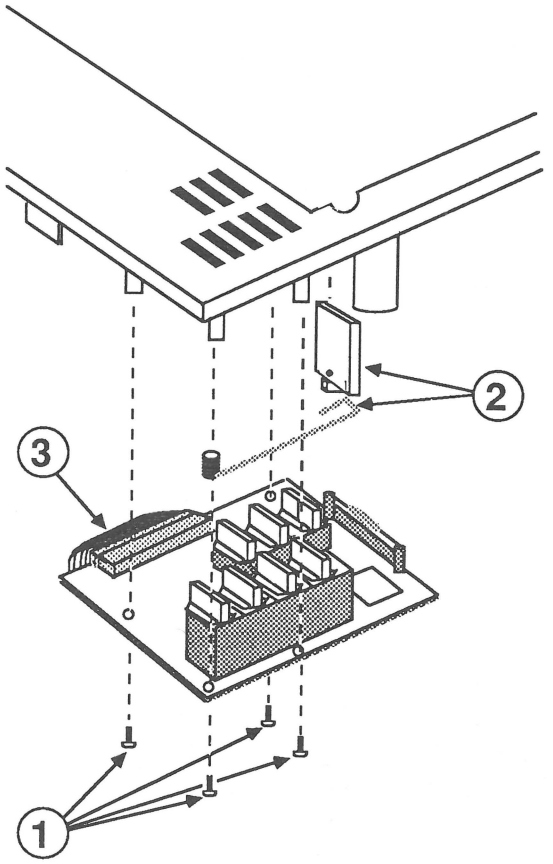


FIGURE 2

Replace

1. Place the top cover upside down.
2. Connect the power button and spring (Figure 2, #2) by placing the coiled half of the spring over the outer-corner screw mount, and over the button in the top opening on the cover.
3. Plug the cable into the operation panel (Figure 2, #3).
4. Line up the screw mounts with the holes on the panel, switch side down.
5. Replace the four screws (Figure 2, #1).
6. Replace the top cover.
7. Replace the paper cover.
8. Perform the self-test.

❑ OPTION CARD

Materials Required

Small pair of curved needlenose pliers

Remove

1. Remove the paper cover.
2. Remove the top cover.
3. Squeeze the plastic retainers (see Figure 3) together one at a time with the pliers, and gently lift the corners of the option card.
4. Lift out the option card.

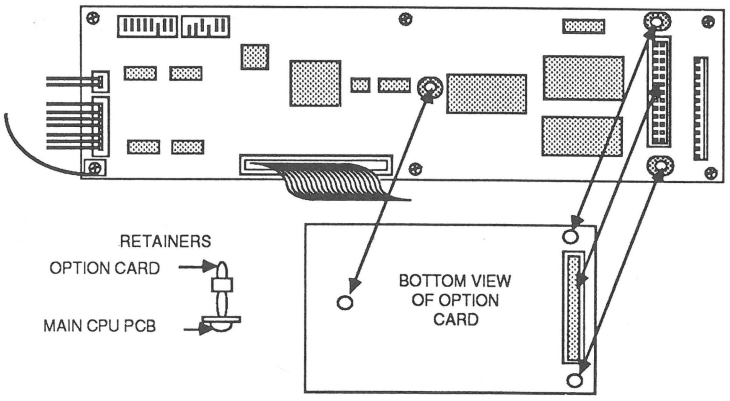


FIGURE 3

Replace

1. Position the option card above the plastic retainers, and line up the connector from the option board with the one on the main CPU PCB (see Figure 3).
2. Push down the option card. It will snap into place.
3. Replace the top cover.
4. Replace the paper cover.
5. Perform the self-test.

❑ MAIN CPU PCB

There are two main CPU PCBs available for the ImageWriter II. For information on identification and compatibility, refer to Section 5, Additional Procedures.

Materials Required

Magnetized, #2 Phillips screwdriver

Remove

1. Remove the paper cover.
2. Remove the top cover.
3. Remove option card, if installed.

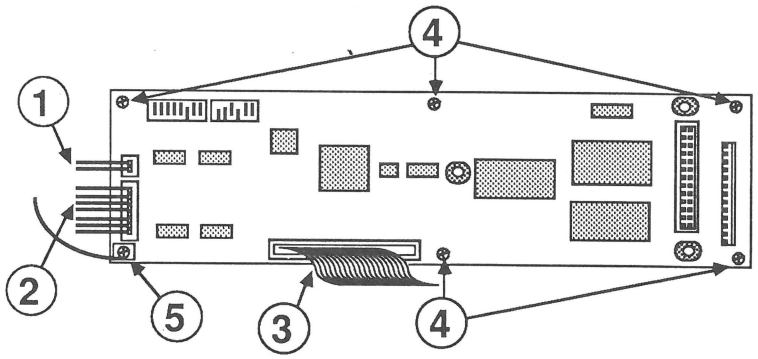


FIGURE 4

4. Remove the three connectors. (Figure 4, #1 is a two-pin; #2 is an 8-pin; and #3 is a 50-pin ribbon cable.)

   a) The 50-pin connector is difficult to remove. Use a small screwdriver and gently pry it loose from one side; then gently rock the connector back and forth until it comes free.

   b) On new main CPU boards, the connector with the tabs is used to make it easier to remove.

5. Remove the five screws (Figure 4, #4).

6. Remove the sixth screw, which holds the grounding strap (Figure 4, #5).

7. Tilt the front half of the board up. Lift the board out of the printer.

Replace

1. Tilt the front half of the board up. Lower the board onto the screw mounts.

2. Install the five screws (Figure 4, #4).

3. Install the sixth screw, which holds the grounding strap (Figure 4, #5).

4. Plug in the three connectors (Figure 4, #1, #2, and #3).

5. Install the option card, if included.

6. Replace the top cover.

7. Replace the paper cover.

8. Perform the self-test.

❑ PRINT HEAD

Remove

1. Remove paper cover.
2. Remove ribbon cartridge.
3. Locate the print head (Figure 5, #1).
4. Gently push aside the white clamp (Figure 5, #2). Grasp the print head and slowly lift it straight up and out of the connector.

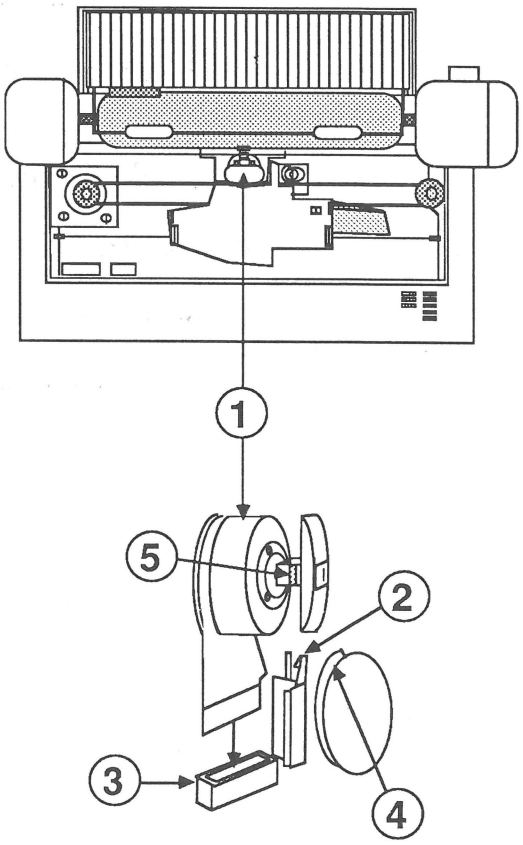


FIGURE 5

Replace

1. Line up the metal connector "fingers" of the print head with the connector (Figure 5, #3).

2. Align the front oblong portion so that it goes between the clear plastic card holder covering the platen (Figure 5, #4) and the print-head clamp (Figure 5, #2). The print-head clamp goes over the indentations on the print head (Figure 5, #5).

3. Gently push the print head down until it is firmly seated.

4. Replace the ribbon cartridge.

5. Replace the paper cover.

6. Perform the self-test.

❑ COLOR RIBBON ASSEMBLY

Materials Required

Small needlenose pliers

Remove

1. Remove the paper cover.
2. Remove the top cover.

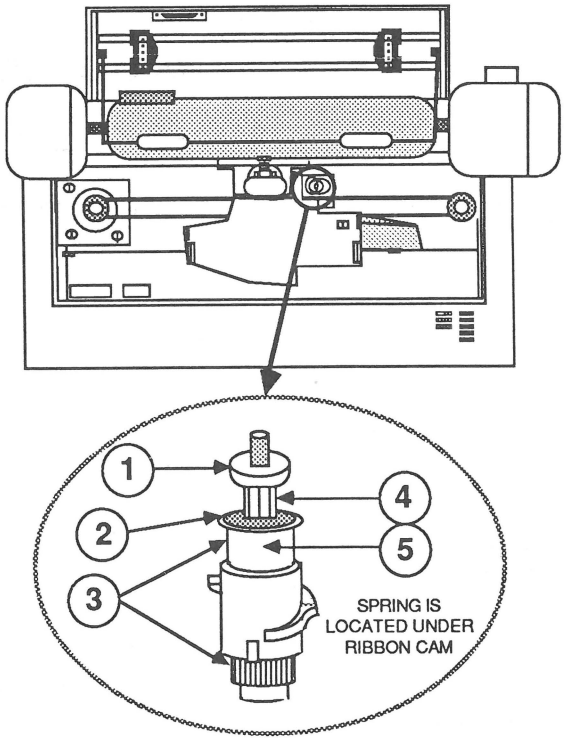


FIGURE 6

3. Remove the lock nut (Figure 6, #1).
4. Remove the retaining clip (Figure 6, #2) with a pair of small needlenose pliers, and take off the two washers.
5. Lift off the ribbon cam (Figure 6, #3), turning it until it is free from the ribbon plate.
6. Remove the adjustment nut (Figure 6, #4).
7. Remove the spring (Figure 6, #5).

Replace

1. Replace the spring (Figure 6, #5).

2. Replace the adjustment nut (Figure 6, #4).

3. Slide on the ribbon cam (Figure 6, #3) so that the ridge on the cam is between the two tabs on the ribbon plate. Improper positioning of the cam can cause poor-quality printing or no printout.

IMPORTANT: *Verify that the two tabs are riding on the ridge. Improper positioning of the cam can cause poor quality or no printout.*

---

4. Replace the two washers and the retaining clip (Figure 6, #2).

5. Replace the lock nut (Figure 6, #1).

6. Perform the color printing adjustment. Refer to Section 4, Adjustments.

❑ RIBBON WIRE AND RIBBON ASSEMBLY

Materials Required #3 jeweler's flathead screwdrivers

Remove

1. Remove paper cover.
2. Remove top cover.
3. Remove ribbon cartridge.

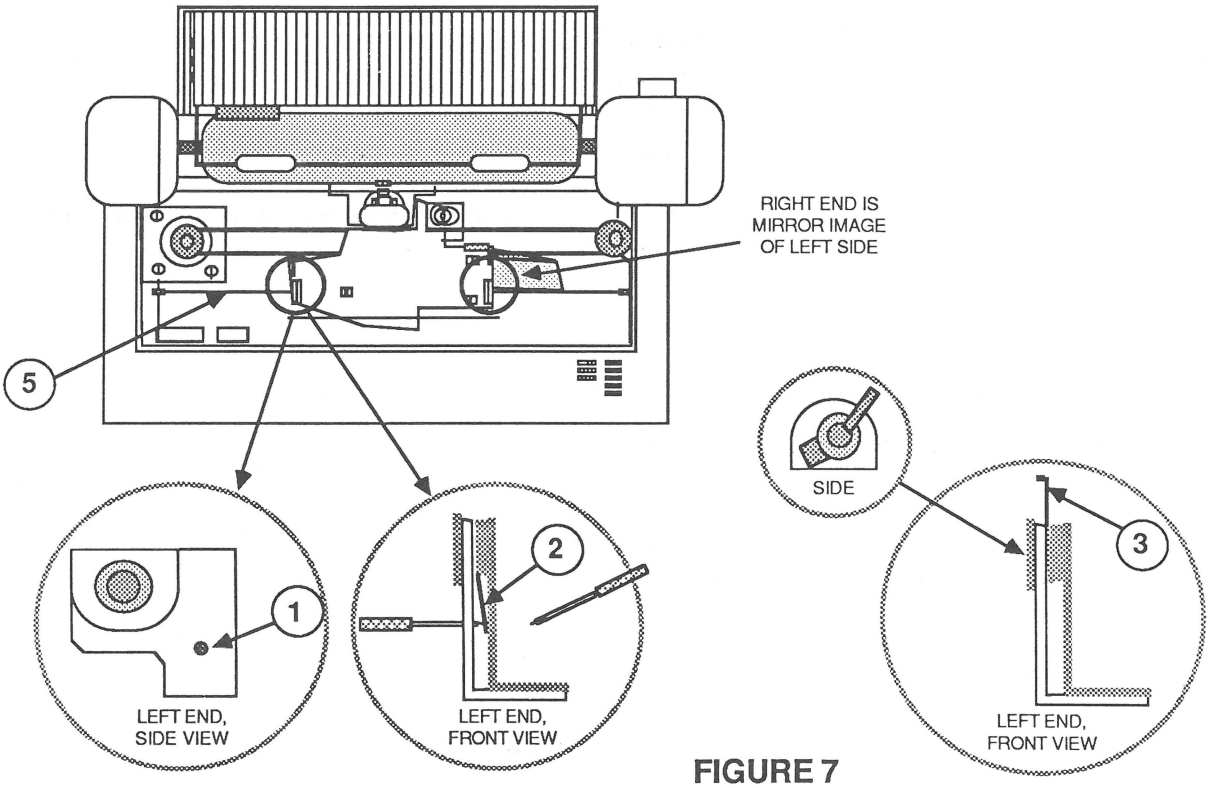


FIGURE 7

4. Locate the holes on the sides of the carrier assembly (Figure 7, #1).
5. Gently insert a jeweler's flathead screwdriver into the hole (Figure 7, #1). The black catch will come out (Figure 7, #2). Gently pry the catch upward at a slight angle with another jeweler's flathead screwdriver.

***IMPORTANT:** Do not use force when removing the black plastic catches or you will break them.*

6. Move the small catch to the top (Figure 7, #3). Gently pull the plastic piece straight out.

7. Repeat for the right side. **The catches are not interchangeable.**

8. Remove the color ribbon selector wires from the plastic clamp (Figure 8, #1) by gently prying the clamp away from the carrier assembly.

9. Using a jeweler's flathead screwdriver, push the tabs toward the center of the ribbon plate (Figure 8, #2).

10. Slowly lift the entire plate up. If the ribbon wire (Figure 7, #5) comes with it, repeat step 9. The gears are located under the plate.

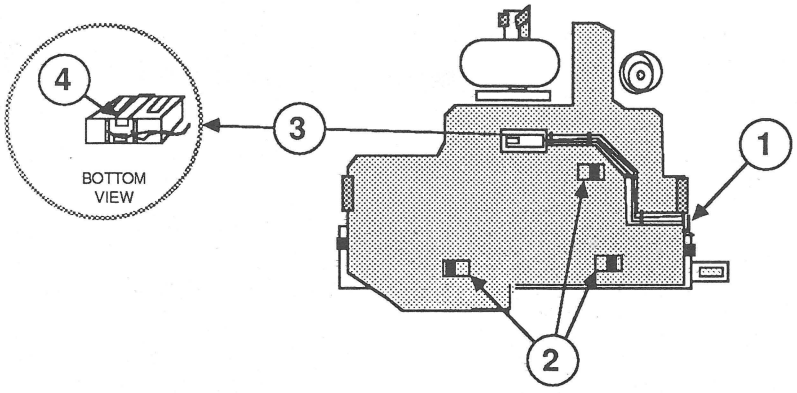


FIGURE 8

11. Lay the ribbon plate upside down to remove the color ribbon detect switch (Figure 8, #3). Do not remove the switch unless replacing the ribbon plate.

12. Insert a jeweler's flathead screwdriver under the tab on each side of the detect switch (Figure 8, #4).

13. Gently push the switch down with a third jeweler's flathead screwdriver.

14. Remove the wires from the retainers on the front of the ribbon plate.

15. Put the ribbon plate aside.

16. Disconnect and remove the ribbon wire (Figure 9, #1).

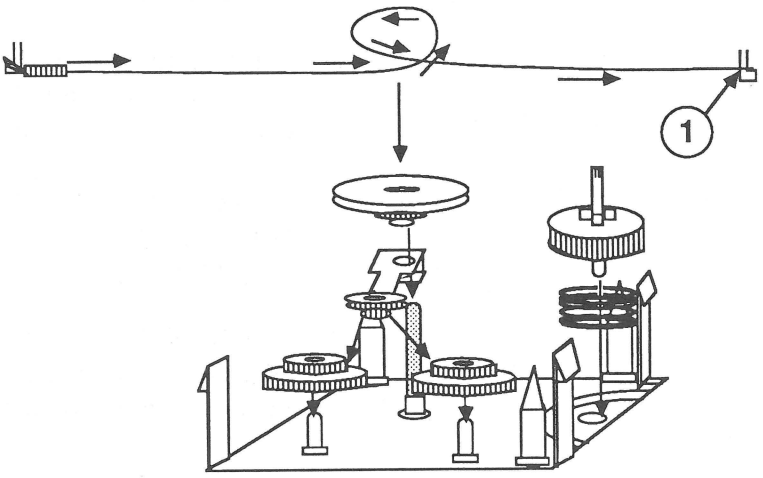


FIGURE 9

Replace

1. Rewrap the ribbon wire as shown in Figure 9. Be sure the wire crosses at the front of the gear. Verify that the spring under the spindle gear is in position before you continue.

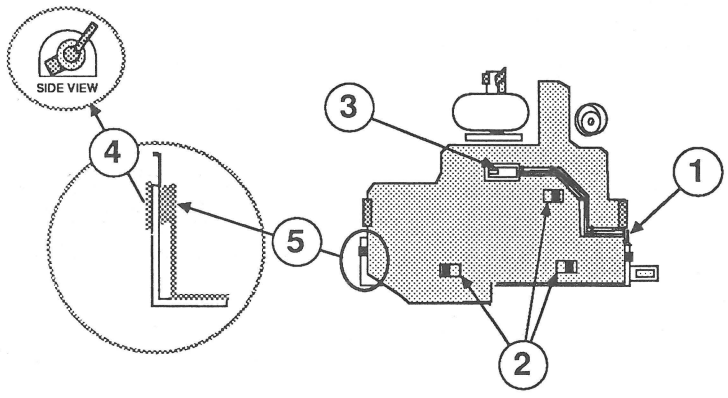


FIGURE 10

2. Gently position and push the ribbon-detect switch into the top of the ribbon plate (Figure 10, #3).

3. Reinstall the wires under the retainers and the bracket (Figure 10, #1).

4. Position the ribbon plate so that the front two tabs on the side have the ridge of the color ribbon assembly between them. Line up the tabs on the gear plate with the top of the ribbon plate (Figure 10, #2), and push the ribbon plate down. It will click into position.

WARNING: *Verify that the two tabs are riding on the ridge of the color ribbon assembly. If they are not, you may get poor print quality or no printout at all.*

---

5. Replace the two small plastic pieces with the catches on them. Slide the piece for the left side (Figure 10, #4) over the left side of the ribbon plate and carrier assembly. Rotate the piece until the black catch pops into the hole on the carrier assembly (Figure 10, #5). Repeat this step for the other piece on the right side.

6. Replace the ribbon cartridge.

7. Replace the top cover.

8. Replace the paper cover.

9. Perform the self-test.

❑ FLEXIBLE RIBBON CABLE

Materials Required

1/8-inch flathead screwdriver

Remove

1. Remove the ribbon wire and ribbon assembly. There are two kinds of ribbon retainers:

   a) One is held in position by a screw (Figure 12, #1).

   b) The other is held by a metal tab that is part of the frame (Figure 12, #3).

   The following procedures refer to screw-fastened retainers. If you are working with the tab-fastened kind, ignore references to the screw. (The tab-fastened retainer can simply be pulled free and removed.)

2. Insert the flathead screwdriver into the notch on the flexible cable connector (Figure 11, #1). Gently turn the screwdriver, and the connector will pop out about 1/4 inch.

WARNING: *Do not force the flexible cable to come loose or you will damage the cable.*

3. Remove the flexible cable from the connector.

4. Push the carriage assembly to the far left. Remove the screw that holds the ribbon retainer in place (Figure 12, #1).

5. Insert the flathead screwdriver in the notch on the connector on the drive PCB (Figure 12, #2). Gently turn the screwdriver, and the connector will pop out about 1/4 inch.

6. Remove the flexible cable from the connector and set it aside.

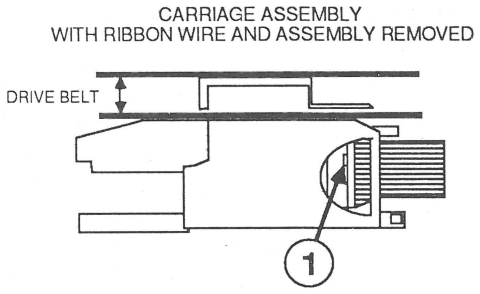


FIGURE 11

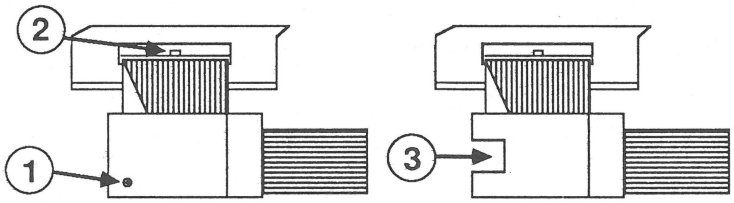


FIGURE 12

Replace

1. Insert the flexible cable in the connector on the drive PCB (Figure 12, #2). Push the connector in.

2. Replace the ribbon retainer and the screw that holds down the retainer for the flexible cable (Figure 12, #1).

3. Push the carriage assembly to the middle. Insert the other end of the flexible cable in the connector (Figure 11, #1). Push the connector in.

4. Replace the ribbon wire and the ribbon assembly.

5. Perform the self-test.

❑ RIBBON MOTOR ASSEMBLY

Materials Required

Jeweler's flathead screwdriver
#2 Phillips screwdriver, magnetized

Remove

1. Remove the ribbon wire and the ribbon assembly.

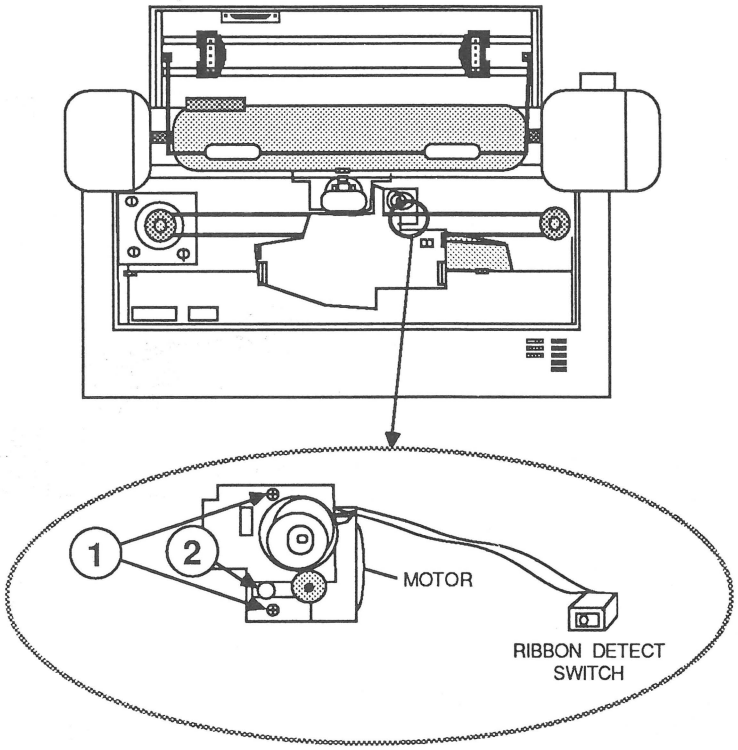


FIGURE 13

2. Remove the two screws that hold the motor in place (Figure 13, #1).

3. Position the jeweler's flathead screwdriver behind the small black plastic extension as shown in Figure 13, #2. Gently pry the motor out. *Note the position of the connector and the wires on the ribbon motor assembly.*

Replace

1. Slide the ribbon motor into position (Figure 13).
2. Replace the two screws that hold the motor in place (Figure 13, #1).
3. Replace the ribbon wire and the ribbon assembly.
4. Perform the self-test.

❑ LEFT SUPPORT LEG

Materials Required

#2 Phillips screwdriver, magnetized

Remove

1. Remove the paper cover.
2. Turn the machine upside down.

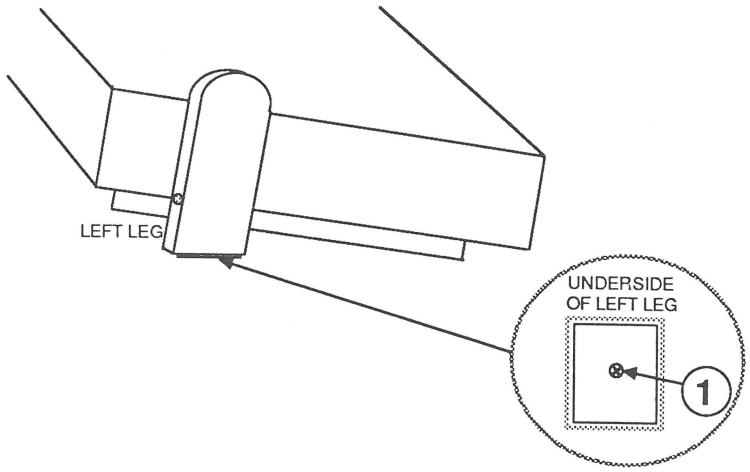


FIGURE 14

3. Remove the Phillips screw at the base of the left leg (Figure 14, #1).
4. Turn the machine right side up.
5. The interface cable connector slides in and out of two notches on the inside of the leg. Push down on the leg and slide it off the plastic frame. The interface connector will slide off as the leg is removed.

Replace

1. With the machine right side up, slide the interface connector into the notches on the inside of the leg.
2. Push the leg into position.
3. Pull upward on the leg to lock it in place.
4. Turn the printer upside down and replace the Phillips screw (Figure 14, #1).
5. Replace the paper cover.
6. Perform the self-test.

❑ RIGHT SUPPORT LEG

Materials Required

#2 Phillips screwdriver, magnetized

Remove

1. Remove the paper cover.
2. Turn the machine upside down.
3. Remove the Phillips screw at the base of the right leg (Figure 15, #1).
4. Turn the machine right side up. Grasp the platen knob and gently pull it off (Figure 15, #2).
5. Slide the paper release lever off (Figure 15, #3).
6. The AC power inlet connector is located inside and is not physically mounted to this leg. Push down and slide the right leg off the plastic frame.

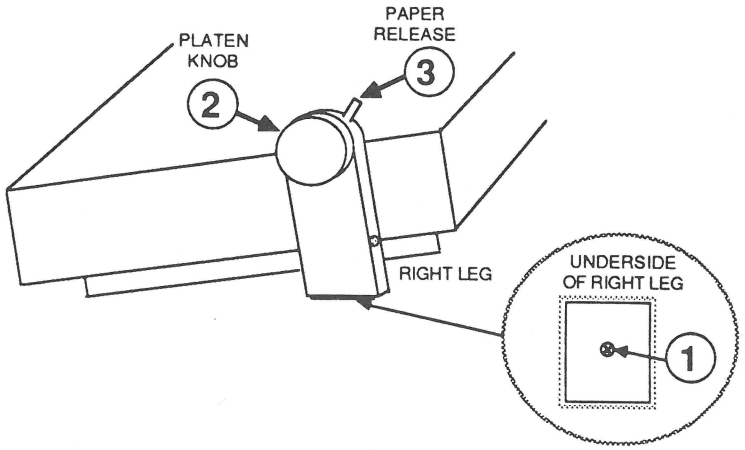


FIGURE 15

Replace

1. With the printer right side up, slide the AC connector into the notches. The wires on the AC connector are short: be careful not to break them off.
2. Push the leg into position.
3. Pull upward on the leg to lock it in place.
4. Slide the paper release lever on (Figure 15, #3).
5. Line up the platen knob and push it into position (Figure 15, #2).
6. Turn the machine upside down and replace the Phillips screw (Figure 15, #1).
7. Replace the paper cover.
8. Perform the self-test.

❑ BOTTOM COVER

Materials Required

#2 Phillips screwdriver, magnetized
Small Phillips screwdriver, magnetized
Flathead screwdriver

Remove

1. Remove the paper cover.
2. Remove the tractor cover.
3. Remove the left and right legs.

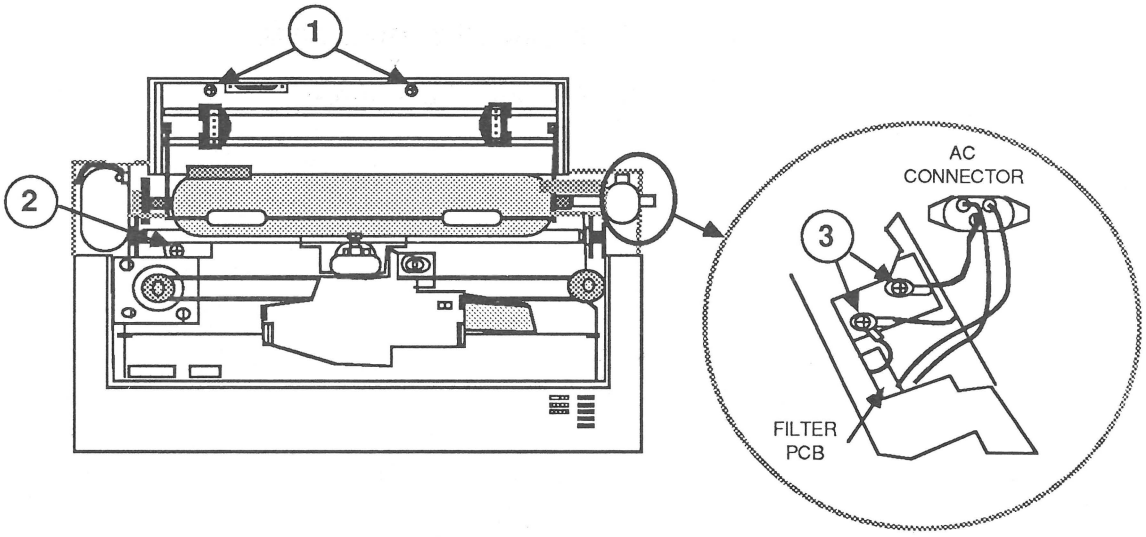


FIGURE 16

4. Remove the two screws located under the tractor cover (Figure 16, #1).
5. Remove the grounding connector from the spade on the drive PCB (Figure 16, #2).
6. Remove the two grounding screws, which hold three grounding wires, located in the right support leg (Figure 16, #3).
7. Push the carriage assembly to the far left. Remove the flexible cable from the drive PCB.
8. Turn the printer upside down and loosen the four screws as far as they will go (Figure 17, #1).

IMPORTANT: *The power supply assembly has four cable connectors and one plug connector, all of which must be disconnected before you remove the bottom cover.*

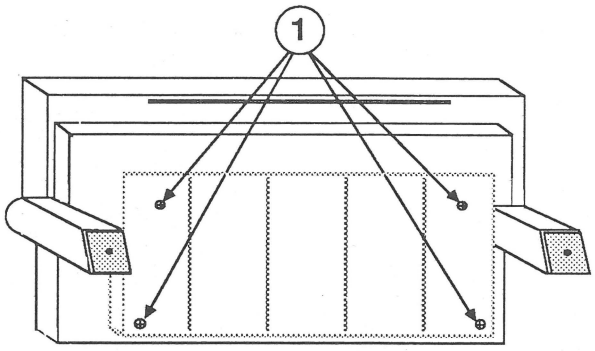


FIGURE 17

9. Using a small flathead screwdriver, gently pry up the left side of the bottom cover. Disconnect the three connectors (Figure 18, #1) in one of two ways:

   a) Some cables are long enough to allow you to lift the left side of the access cover about 3 inches—until you can reach the three connectors located on that side of the board and disconnect them.

   b) Using a pair of curved needlenose pliers, access the connectors through the left support leg and gently disconnect them.

10. Lift the front half of the bottom cover, and disconnect the 50-pin ribbon cable. (Figure 18, #2).

    The 50-pin connector is difficult to remove. Use a small screwdriver to gently pry it loose from one side; then gently rock the connector back and forth until it comes free.

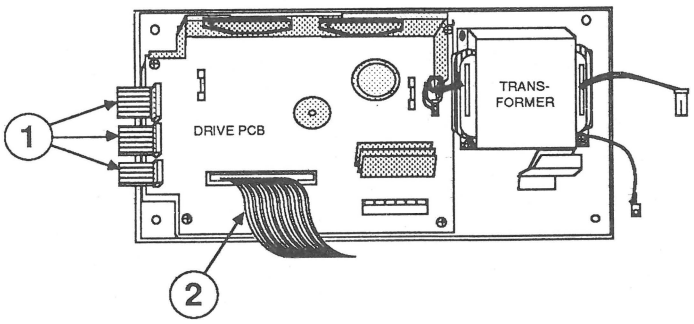


FIGURE 18

11. Carefully lift the bottom cover from the back and flip the bottom cover toward the front.

12. Disconnect the plug cable running from the right leg to the transformer on the bottom cover (Figure 19, #2).

13. Remove the bottom cover.

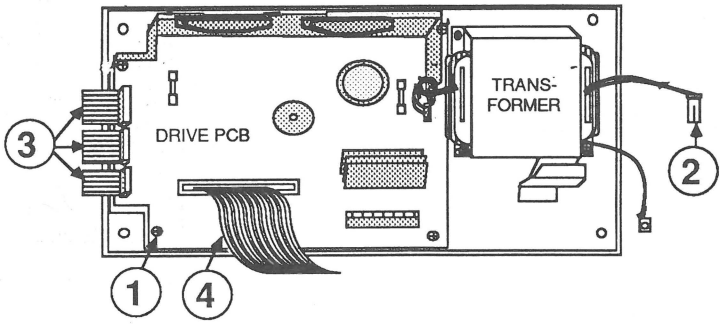


FIGURE 19

Replace

1. Place the bottom cover face up on the bottom of the printer.

2. Connect the plug cable running from the right leg to the bottom cover (Figure 19, #2).

3. Lift the rear portion of the bottom cover, and connect the 50-pin ribbon cable (Figure 19, #4).

4. Route the grounding strap from the transformer into the right support leg.

5. Tilt the bottom cover toward you and lower it into place. Check all the wires and cables: be sure they are not crimped and are correctly routed.

6. Connect the three cables on the left side (Figure 19, #3). There are two ways to connect the three cables:

   a) Some cables are long enough to allow you to lift the left side of the access cover about 3 inches—until you can reach the three connectors located on that side of the board and connect them.

   b) Using a pair of curved needlenose pliers, access the three connectors through the left support leg, and then gently connect them with the pliers.

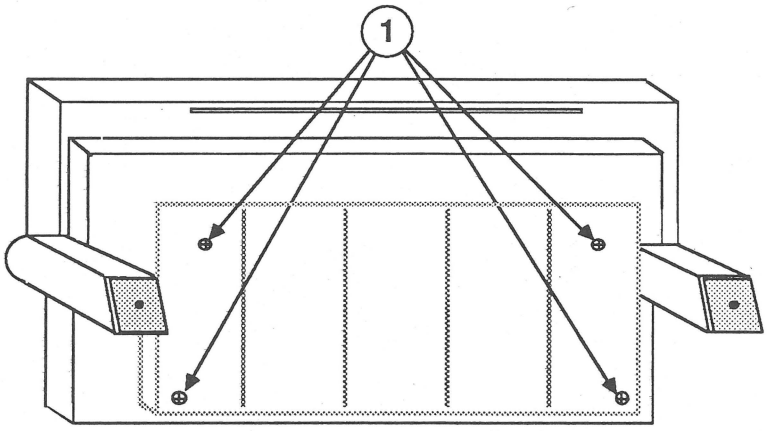


FIGURE 20

7. Replace the four screws that hold the bottom cover in place (Figure 20, #1).

8. Turn the printer right side up.

9. Connect the grounding connector to the spade on the corner of the drive PCB (Figure 19, #1).

10. Replace the two screws (Figure 21, #1).

11. Reconnect the three grounding straps and two screws into the right support leg (Figure 21, #2).

12. Push the carrier assembly to the far left and connect the flexible cable to the drive PCB.

13. Replace the left and right support legs.

14. Replace the tractor cover.

15. Replace the paper cover and run the self-test.

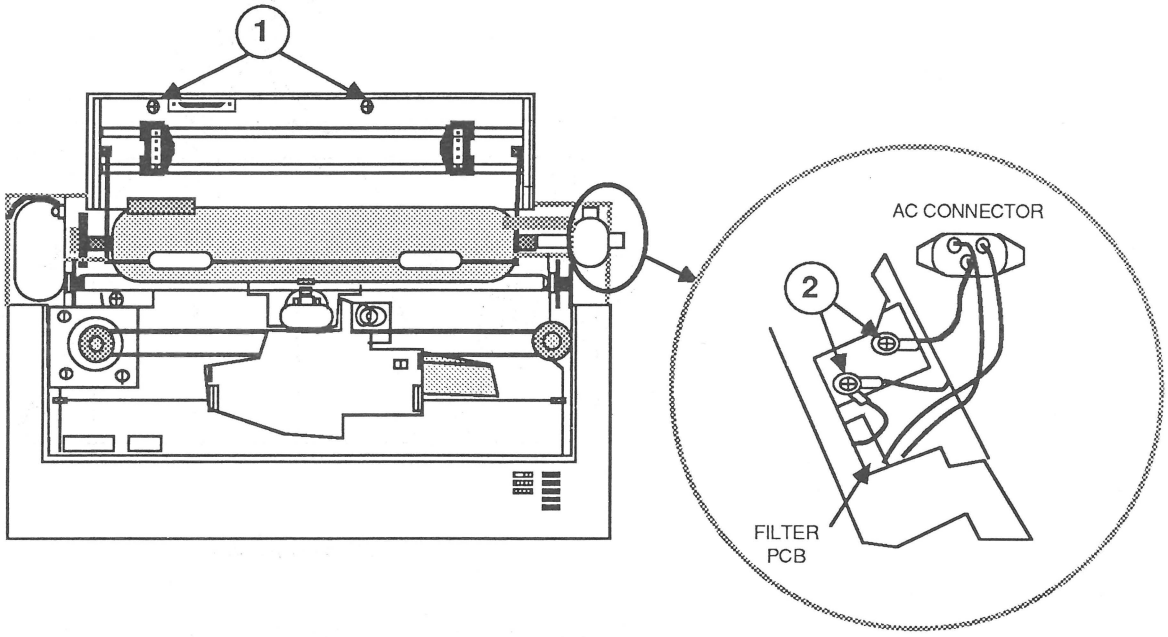


FIGURE 21

❑ FUSES

Materials Required

Fuse puller
Digital multimeter

There are two fuses on the drive board on the bottom cover. Check the fuses to verify that they are good. If a fuse is bad, replace it.

Remove

1. Remove the bottom cover.

2. Examine the fuses for burn marks. If possible, check them with a multimeter (refer to Section 3, Troubleshooting).

   Fuse 1 (Figure 22, #1) is a 1-amp fuse.

   Fuse 2 (Figure 22, #2) is a 5-amp fuse.

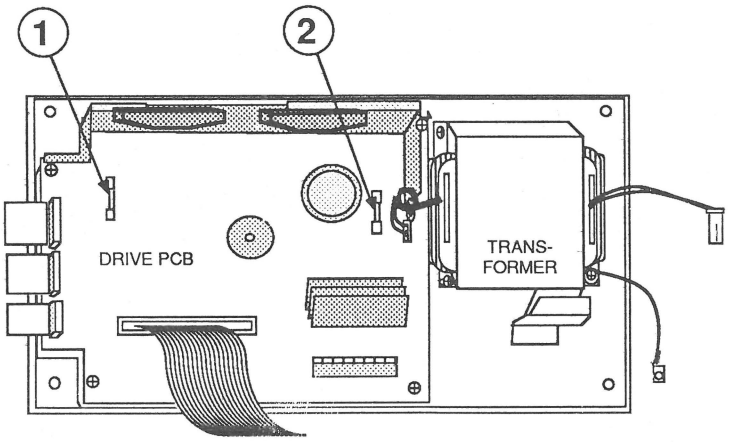


FIGURE 22

Replace

1. Replace any defective fuses.

2. Replace the bottom cover.

❑ TRANSFORMER

Materials Required

#2 Phillips screwdriver

Remove

1. Remove the bottom cover.
2. Disconnect the cable to the drive PCB (Figure 23, #1).
3. Remove the three screws (Figure 23, #2).
4. Lift out the transformer.

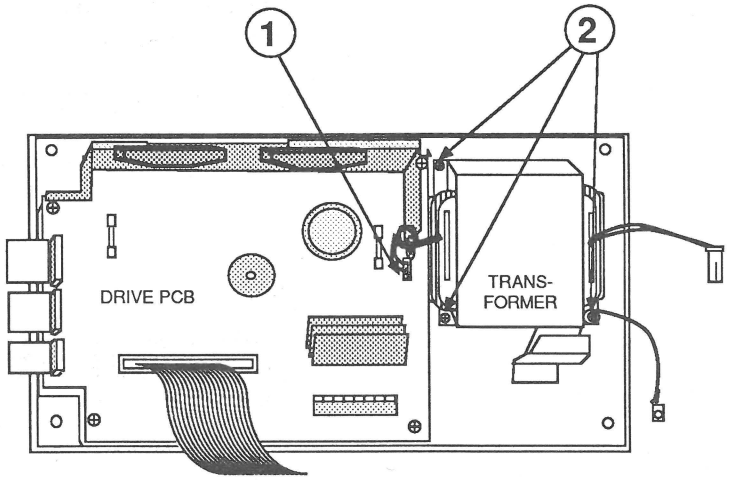


FIGURE 23

Replace

1. Place the transformer on the bottom cover so that the screw holes line up.
2. Replace the three screws (Figure 23, #2).
3. Connect the cable to the drive PCB (Figure 23, #1).
4. Replace the bottom cover.
5. Perform the self-test.

❑ DRIVE PCB

Material Required

#2 Phillips screwdriver

Remove

1. Remove the bottom cover.
2. Disconnect the cable from the transformer (Figure 24, #1).
3. Remove the three screws from the drive PCB (Figure 24, #2).
4. Lift out the drive PCB.

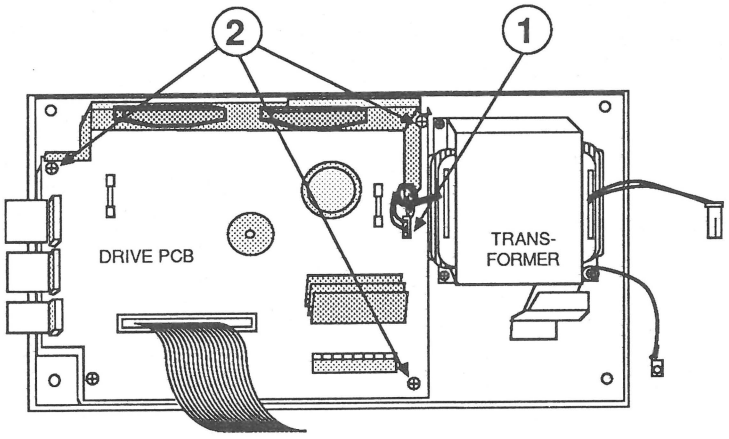


FIGURE 24

Replace

1. Place the drive PCB on the bottom cover so the screw holes line up.
2. Replace the three screws (Figure 24, #2).
3. Connect the cable from the transformer (Figure 24, #1).
4. Replace the bottom cover.
5. Perform the self-test.

❑ MECHANICAL ASSEMBLY

Materials Required

#2 Phillips screwdriver, magnetized

Note: The mechanical assembly is not available as a replacement part.

Remove

1. Remove the paper cover.
2. Remove the tractor cover.
3. Remove the top cover.
4. Remove the print head.
5. Remove the logic board.
6. Remove the left and right legs.
7. Remove the bottom cover.

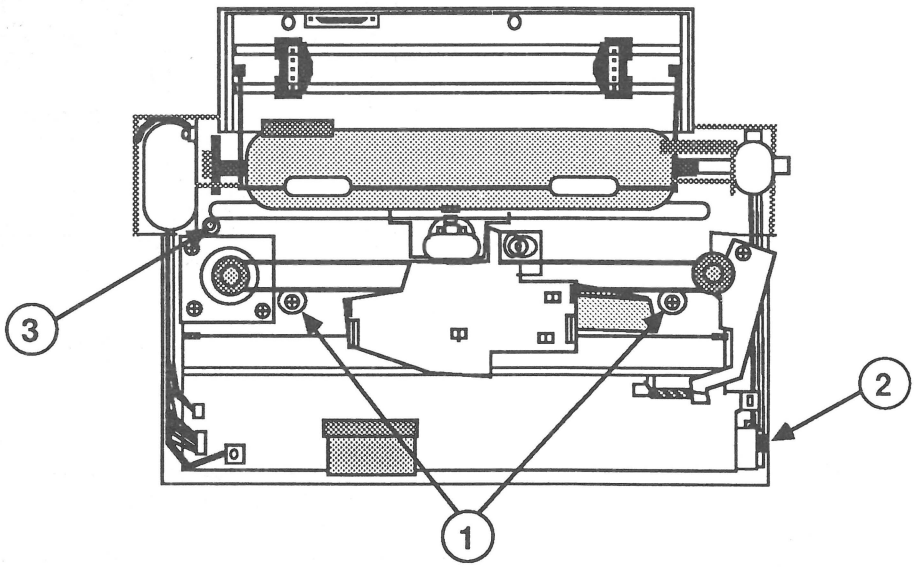


FIGURE 25

8. Remove the two mounting screws (Figure 25, #1).

Note: If the mechanical assembly has a third mounting screw (Figure 25, #3), remove it also.

9. Lift the right side of the mechanical assembly, and disconnect the two plug connectors (Figure 25, #2).

10. Lift the entire mechanical assembly from the plastic case.

Replace

1. Position the 50-pin cable on the bottom of the plastic case. Place the noise filter PCB in the right support leg. Verify that the PCB is lying flat in the bottom of the leg.

2. Tilt the mechanical assembly into the plastic case. Keep the right side lifted and connect the two plug connectors (Figure 25, #2). Make sure the assembly sits under the three white plastic tabs on the rear of the case. Make sure all wires and cables are routed correctly. Check for any crimped wires or cables. Slide the mechanical assembly into the plastic case. Line up the screw holders.

IMPORTANT: *On new models of the printer, the plug connector is located in the right support leg. Be sure you connect the top two cables from the power-on switch to the noise PCB and the bottom two cables to the transformer. Failure to make these connections will cause all lights on the operation panel to remain lit.*

3. Replace the two screws (Figure 25, #1).

4. Replace the bottom cover.

5. Replace the left and right legs.

6. Replace the logic board.

7. Replace the top cover.

8. Replace the print head.

9. Replace the tractor cover.

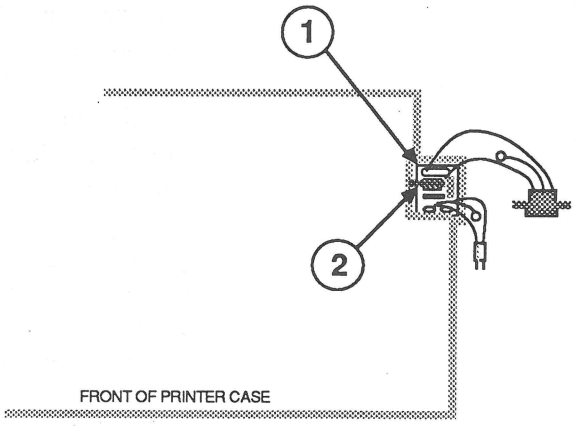
10. Replace the paper cover.

❑ NOISE FILTER PCB ASSEMBLY

Remove

1. Remove the mechanical assembly.

2. Locate the noise filter PCB in the right support leg (Figure 26, #1).



TOP VIEW
INTO RIGHT SUPPORT LEG

FIGURE 26

3. Lift the tab (Figure 26, #2) and lift out the noise filter PCB assembly (Figure 27).

4. Check the fuse on the noise filter PCB (Figure 27, #1) with a multimeter. Refer to Section 3, Troubleshooting, for more information.

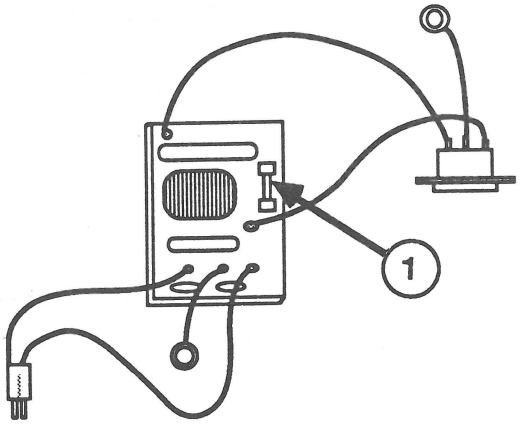


FIGURE 27

Replace

1. Lift the tab (Figure 26, #2) and slide the noise filter PCB assembly into place.
2. Replace the mechanical assembly.
3. Perform the self-test.

❑ CARRIER MOTOR AND CARRIER BELT

Materials Required

#2 Phillips screwdriver

Remove

1. Remove the mechanical assembly.
2. Remove the ribbon plate. (It is not necesssary to remove the entire ribbon wire assembly.)
3. Remove the screw that holds the black plastic carrier belt guide (Figure 28, #1). Some guides are glued to the belt: *Do not pry the guide off the assembly unless you are replacing the carrier belt.*
4. Loosen the carrier belt adjustment screw (Figure 28, #2).
5. Gently push in on the metal plate under the screw, and remove the drive belt from the right carrier motor pulley. Lift the carrier belt from the machine (Figure 28, #3).
6. Disconnect the three screws holding the carrier motor in place (Figure 28, #4). The motor will drop out.

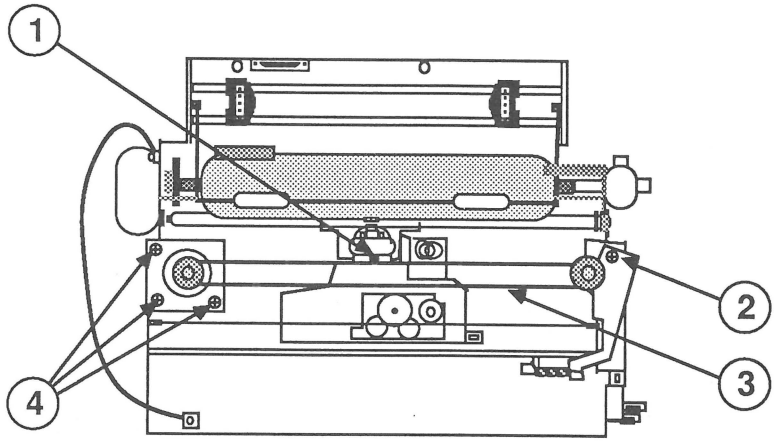


FIGURE 28

Replace

1. Position the carrier motor with the connector and wires toward the rear of the machine, and replace the three screws (Figure 28, #4).

2. Replace the carrier belt on the left pulley and align it (Figure 28, #3). Push in on the metal plate of the carrier adjustment (Figure 28, #2), and replace the carrier belt on the right pulley.

3. Place the plastic carrier belt guide in position and replace the screw (Figure 28, #1).

4. Tighten the carrier belt adjustment screw.

5. Replace the ribbon assembly.

6. Replace the mechanical assembly.

7. Perform the self-test.

❑ CARRIER BLOCK ASSEMBLY AND PRINT HEAD PCB

Materials Required

#2 Phillips screwdriver
Jeweler's flathead screwdriver

Remove

1. Remove the mechanical assembly.
2. Remove the ribbon wire and ribbon assembly.
3. Remove the color ribbon assembly.
4. Remove the ribbon motor assembly.
5. Remove the carrier drive belt.

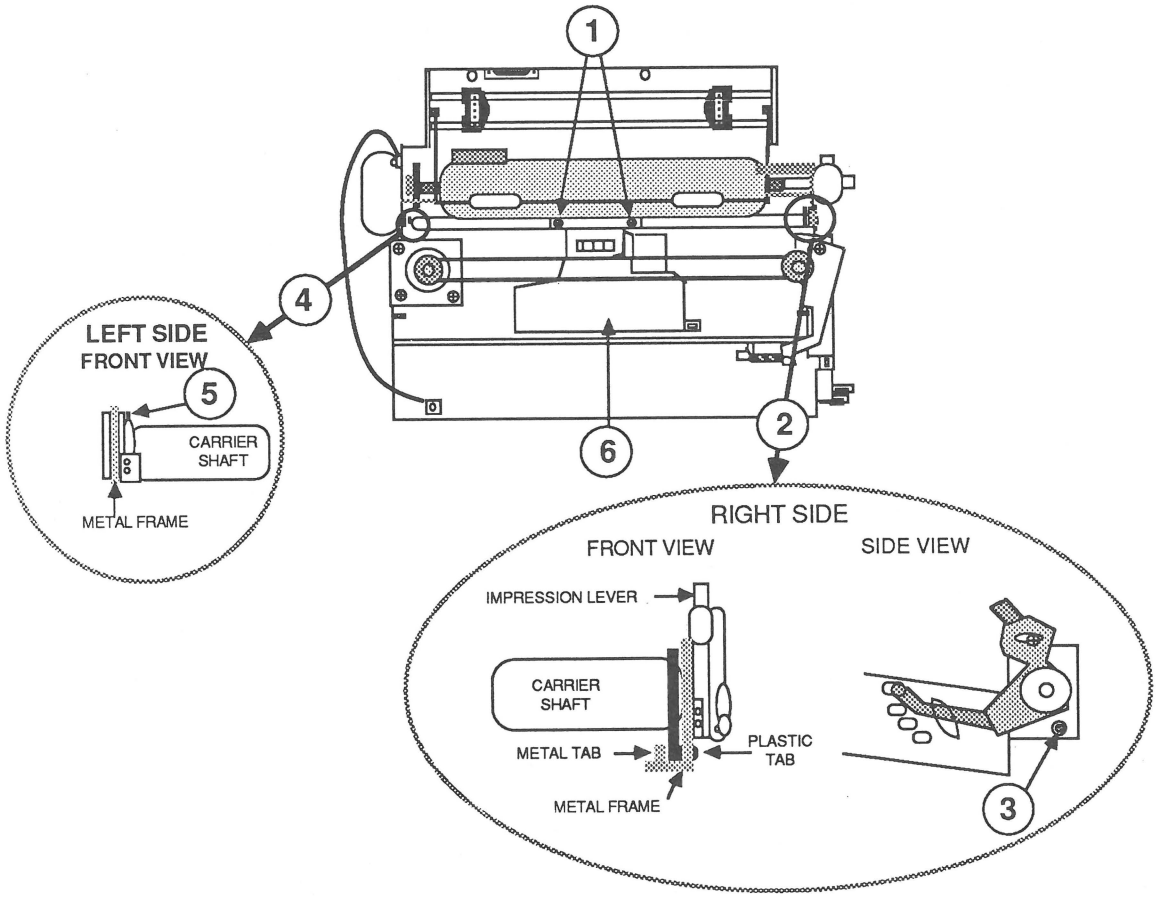


FIGURE 29

6. Remove the two screws holding the clear plastic paper guide (Figure 29, #1).

7. Look at Figure 29, #2, for the connection of the right side of the carrier shaft to the frame. Pry forward the metal tab that is part of the frame.

8. Gently insert a jeweler's flathead screwdriver into the hole in the frame containing the tab (Figure 29, #3). Gently push the tab backward and lift the right side of the carrier shaft free.

9. Look at Figure 29, #4, to see where to connect the left side of the carrier shaft to the frame.

10. Gently push back the metal tab (Figure 29, #5), and slide the carrier shaft to the right until it is free.

11. Pull the back of the carrier assembly (Figure 29, #6) toward the front of the machine to release the tabs holding the assembly in position, and lift up the carrier assembly and the carrier shaft.

12. Remove the carrier cam (shaped like a washer) from the left side of the carrier shaft.

13. Turn the carrier assembly and the carrier shaft over. Slide the carrier shaft free of the carrier assembly. There are two felt wipers (for lubrication purposes) where the carrier shaft slides through the carrier assembly. Remove them (Figure 30, #1).

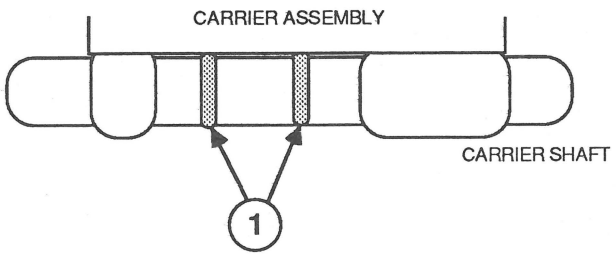


FIGURE 30

14. Locate the black plastic clamp on the carrier assembly holding the small connector in place (Figure 31, #1). Pry the two tabs (Figure 31, #2) loose and gently pull the clamp up and off.

15. Remove the two screws holding the print head PCB in place (Figure 31, #3).

16. Gently lift the side of the board (Figure 31, #4). Slide it out from the tabs and remove it from the carrier assembly.

17. Slide out the small three-pin connector (Figure 31, #5) mounted on the carrier assembly.

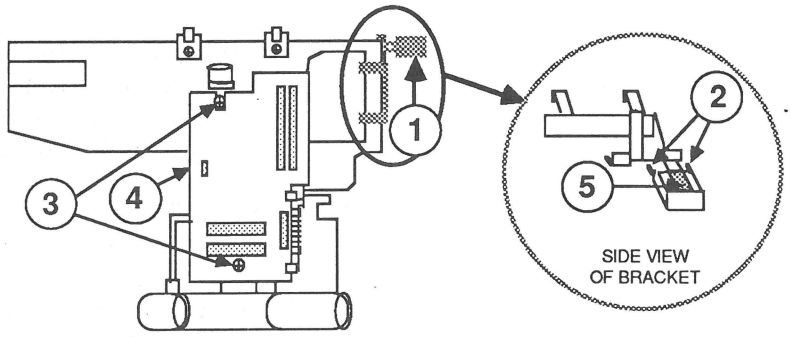


FIGURE 31

Replace

1. Slide the small three-pin connector, which is wired to the print head PCB, onto the mount provided on the carrier assembly (Figure 31, #5).

2. Position the print head PCB on the carrier assembly.

3. Replace the two screws (Figure 31, #3).

4. Position the bracket as shown in Figure 31, #1, and snap it into place.

5. Slide the carrier shaft through one end of the carrier assembly, replace the two felt wipers, and slide the carrier shaft through the other side of the carrier assembly (Figure 32, #1).

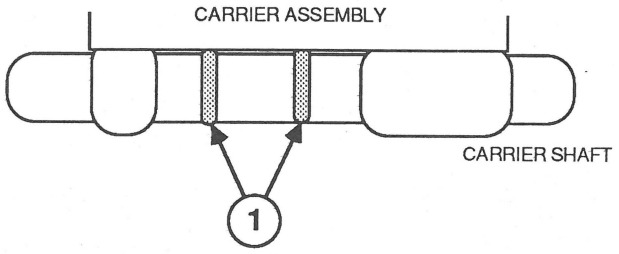


FIGURE 32

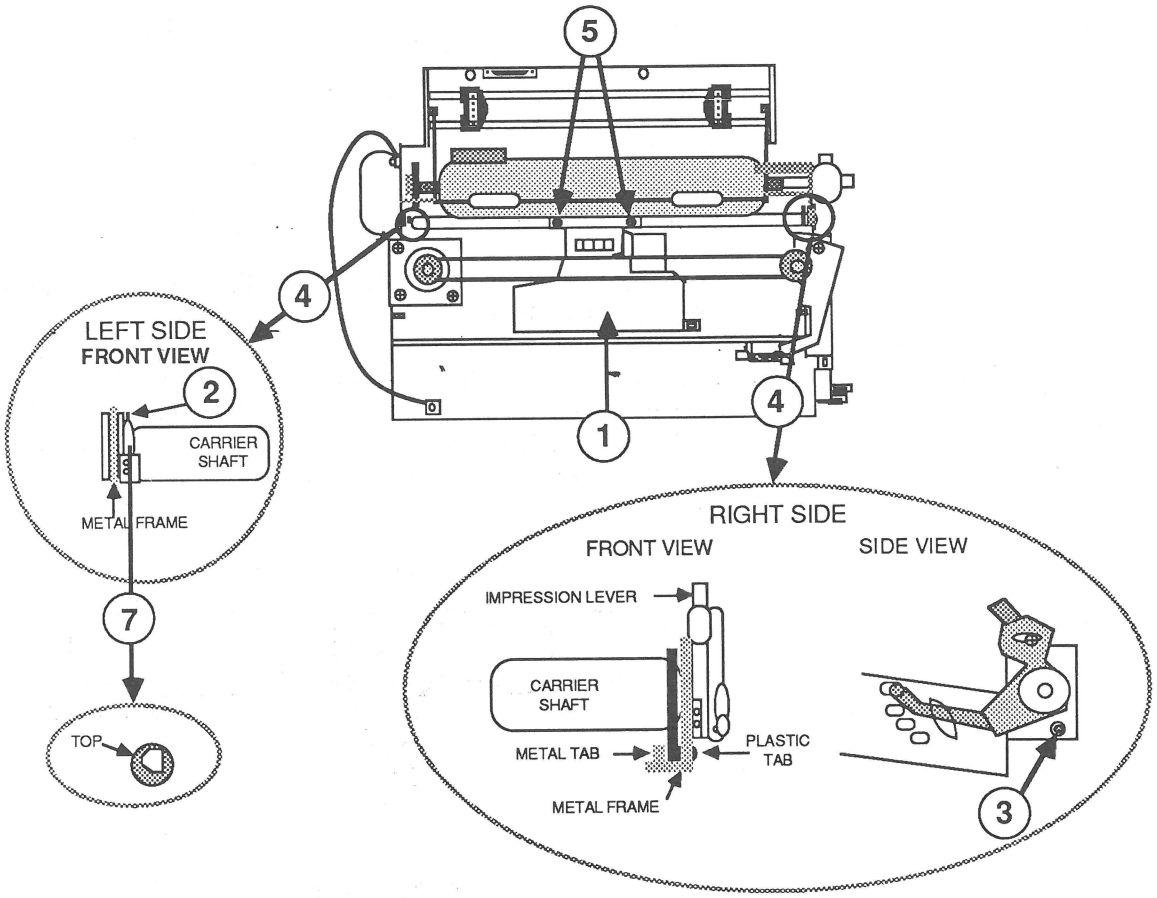


FIGURE 33

6. Place the carrier cam on the left side of the carrier shaft. Be sure to position it as shown in Figure 33, #7, with the smaller section as the top of the cam. The wrong position will produce uneven printing.

IMPORTANT: *To be sure you get even printing intensity, be sure to position the carrier cam with the smaller section as the top of the cam.*

7. Position the carrier assembly so the tabs underneath the assembly (Figure 33, #1) are in place.

8. Push back the tab (Figure 33, #2), and slide the left side of the carrier shaft into place while making sure the right side is lined up.

9. Slide the right side of the carrier shaft into position, making sure that the tab is in the hole in the metal frame and that the impression lever is in position (Figure 33, #3).

10. Push the metal tab back toward the rear of the machine (Figure 33, #4).

11. Verify that the impression lever is pushed forward all the way. Position the clear plastic paper guide and replace the two screws (Figure 33, #5). (Refer to Section 4, Adjustments, if you need more information.)

12. Replace the carrier drive belt.

13. Replace the ribbon motor assembly.

14. Replace the color ribbon assembly.

15. Replace the ribbon wire and ribbon assembly.

16. Replace the mechanical assembly.

17. Perform the self-test.

❑ PLATEN AND PLATEN ASSEMBLY

Materials Required

Pin punch (1/16 inch)
Soldering iron, solder sucker, and solder

Remove

1. Remove the tractor cover.
2. Remove the top cover.
3. Remove the print head.
4. Remove left and right support legs.
5. Remove the paper bail assembly screws (Figure 34, #1).
6. Remove the two screws (Figure 34, #2) that hold the paper guide in place. Lift the paper guide out of the machine.

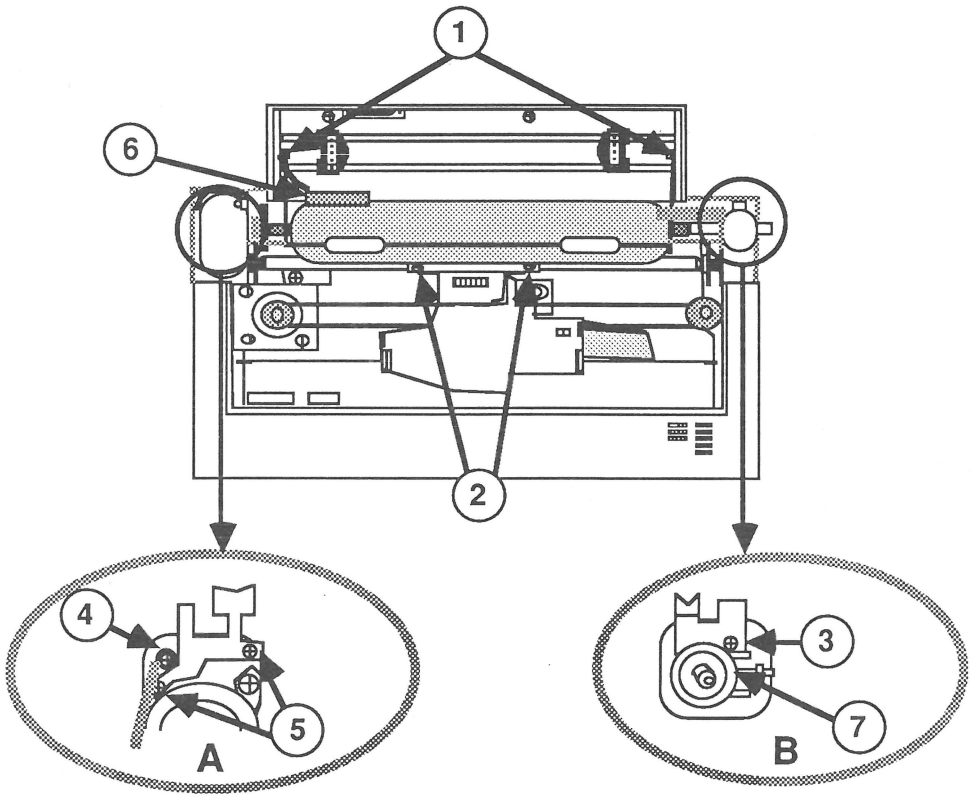


FIGURE 34

7. From the right side of the printer, remove the screw (Figure 34, #3) that holds the metal plate in place. Set the metal plate and screw aside.

8. From the left side, remove the screw (Figure 34, #4) that holds the grounding strap in place.

9. From the left side, remove the two screws that hold the metal plate in place (Figure 34, #5). Set the metal plate and two screws aside.

10. Locate the metal plate attached to the platen (Figure 34, #6). The plate has a small black grounding wire either soldered to it or attached with a screw: either unsolder the wire or remove the screw.

11. Lift the platen left side first from the machine, and slide the shaft free from the right side.

12. On the right side of the machine are two plastic pieces, the platen bushing and the free lever. The platen shaft slides into the bushing (Figure 34, #7). Use a flathead screwdriver to gently snap the outer piece free. Remove both pieces.

13. Locate the two pins on the platen (Figure 35, #1). Remove both pins using a pin punch; then remove all the black plastic pieces from the platen.

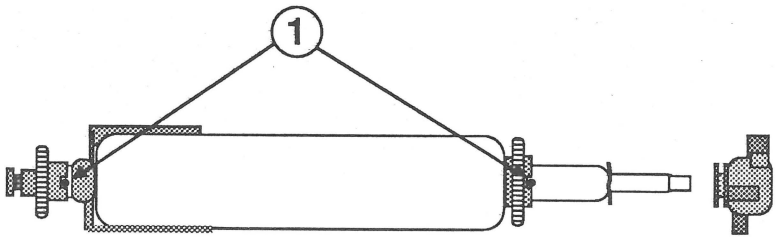


FIGURE 35

Note: There is no paper-empty frame (Figure 36, #1) when an optical paper-out sensor is installed.

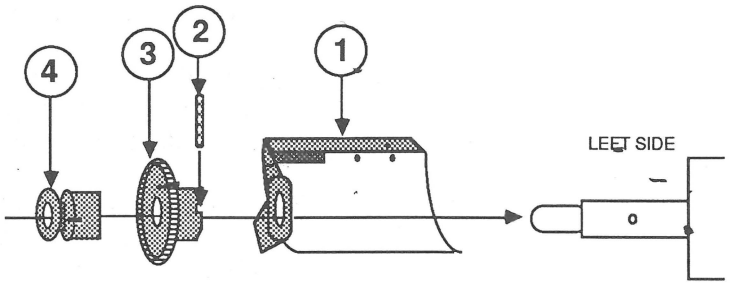


FIGURE 36

Replace

1. Assemble the left side of the platen (Figure 36). Slide the paper-empty frame (Figure 36, #1) into place and insert the pin (Figure 36, #2). Slide the platen gear and then the platen bushing into place (Figure 36, #3 and #4).

   Note: There is no paper-empty frame (Figure 36, #1) when an optical paper-out sensor is installed.

2. Assemble the right side of the platen (Figure 37). Slide the drive gear (Figure 37, #1) into position and insert the pin (Figure 37, #2). Slide the platen spring into position (Figure 37, #3).

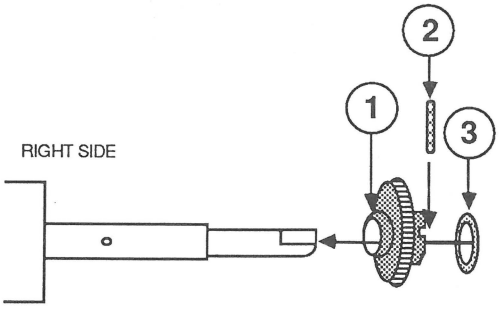


FIGURE 37

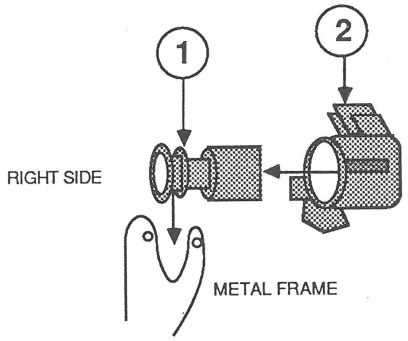


FIGURE 38

3. Position the platen bushing (Figure 38, #1) into the frame on the right side of the printer. Slide the free lever (Figure 38, #2) onto the bushing.

4. Slide the right side of the platen shaft into the bushing and lever (Figure 39, #1). Line up the tab on the paper-empty frame with the notch in the plastic frame (Figure 39, #2). Drop the left side into place (Figure 39, #3).

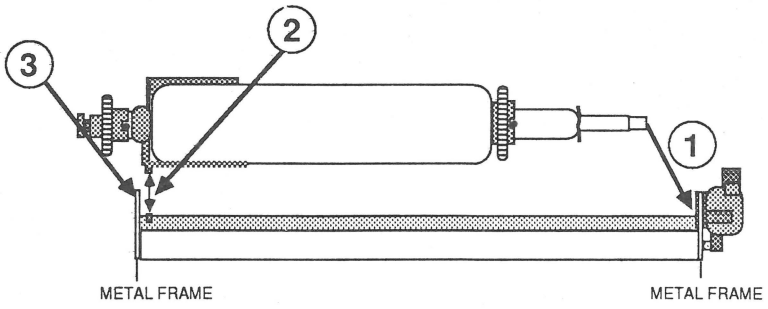


FIGURE 39

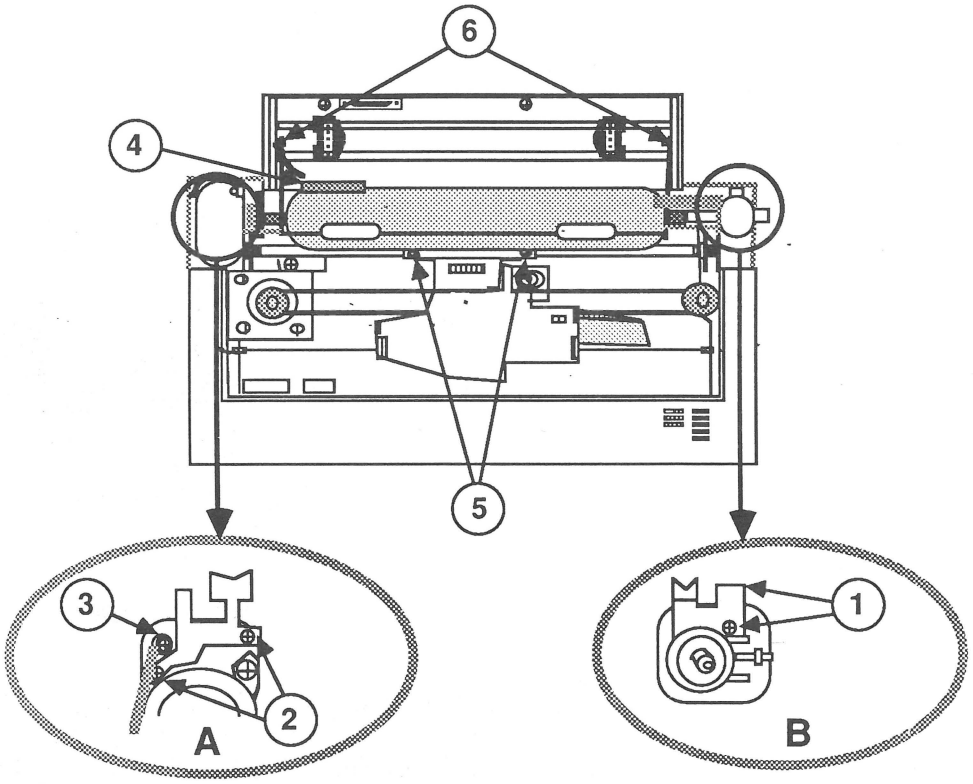


FIGURE 40

5. Position the metal plate on the right side of the platen and replace the screw that holds it (Figure 40, #1).

6. Position the metal plate on the left side of the platen and replace the two screws that hold it (Figure 40, #2).

   Note: The plate has an elongated hole in it. Be sure to press the plate down as you tighten it; otherwise the printer will have form feed problems on the left side.

7. Position the grounding strap and replace the screw that holds it (Figure 40, #3).

8. Locate the small black grounding wire. Solder the wire to the metal plate on the paper empty frame, or replace the screw (Figure 40, #4).

9. Position the paper guide and replace the two screws that hold it (Figure 40, #5).

10. Replace the paper bail assembly (Figure 40, #6).

11. Replace the left and right support legs.

12. Replace the print head.

13. Replace the top cover.

14. Replace the tractor cover.

15. Perform the self-test.

❑ PAPER-FEED MOTOR

Materials Required

#2 Phillips screwdriver, magnetized

Note: It is not necessary to remove the logic board from the mechanical assembly for this procedure.

Remove

1. Remove the mechanical assembly.

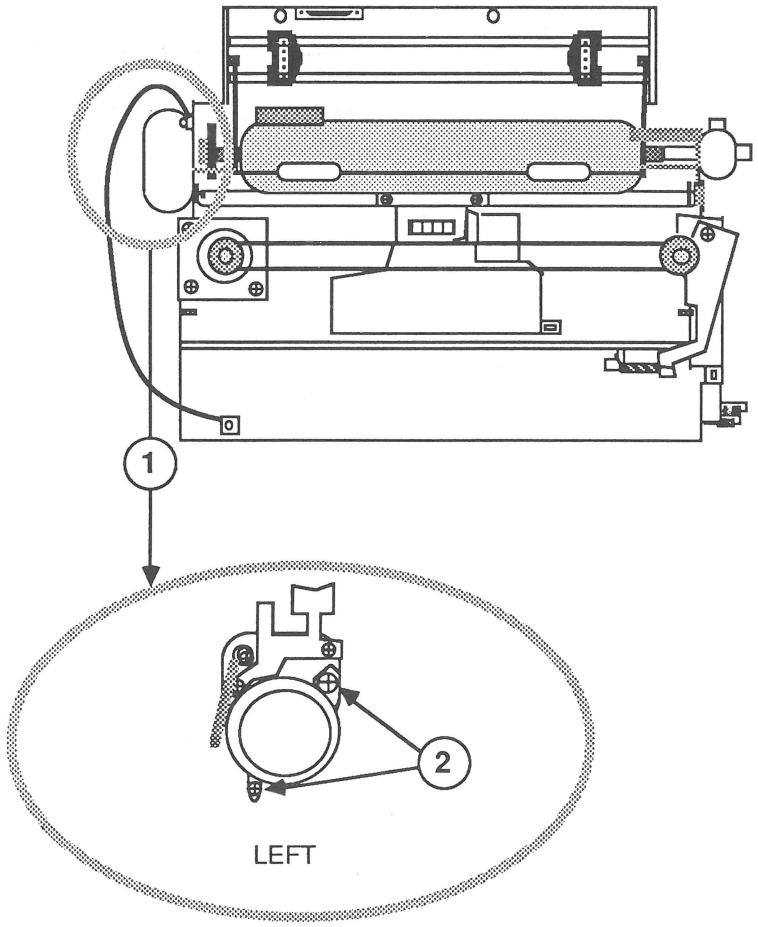


FIGURE 41

2. Locate the paper-feed motor (Figure 41, #1).

3. Remove the two screws that hold the motor in place (Figure 41, #2).

4. Gently pull the motor off the mechanical assembly.

Replace

1. Slide the paper-feed motor onto the mechanical assembly.

2. Replace the two screws that hold the motor in place (Figure 41, #2).

3. Replace the mechanical assembly.

❑ PAPER GUIDE

Materials Required

#2 Phillips screwdriver, magnetized
Small flatblade screwdriver

Remove

1. Remove the mechanical assembly.
2. Remove the platen and platen assembly.

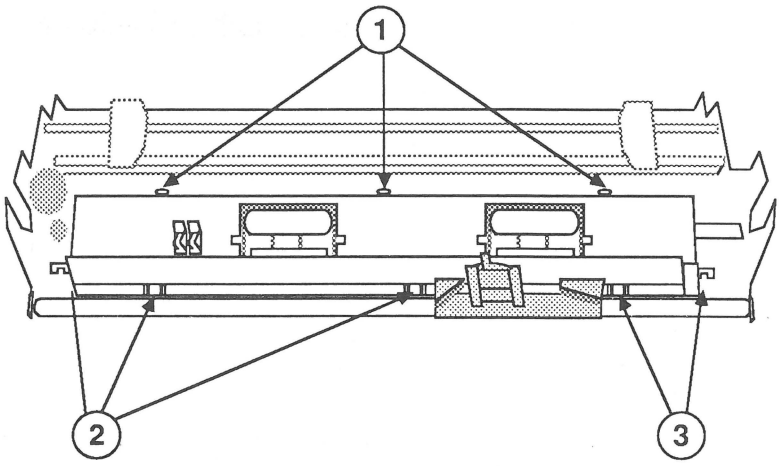


FIGURE 42

3. Remove the three screws that hold the paper guide in place (Figure 42, #1).
4. Push the carrier to the left; then gently unhook each of the three tabs (Figure 42, #2) with a small flatblade screwdriver.
5. Push the carrier to the right; then gently unhook each of the remaining two tabs (Figure 42, #3) with a small flatblade screwdriver.
6. Lift off the paper guide.
7. Lift the two pinch-rollers and pinch-roller spring plates off the paper guide and set them aside.

Replace

1. Position the two pinch-roller spring plates (Figure 43, #1) on the paper guide.

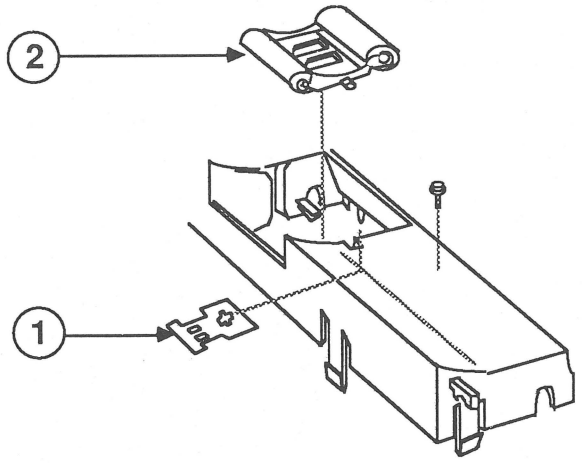


FIGURE 43

2. Position the paper guide so that the tabs line up with the assembly. Gently press the paper guide into position.

3. Place the pinch-rollers (Figure 43, #2) on the paper guide and replace the three screws.

4. Replace the platen and the platen assembly.

5. Replace the mechanical assembly.

❑ PAPER-OUT SENSOR

Materials Required

#2 Phillips screwdriver
Small flatblade screwdriver

Remove

There are two paper sensors: one is a mechanical paper-out sensor (Figure 44, #1), and one is an optical paper-out sensor (Figure 45, #1). For information on the compatibility of these sensors with the main CPU PCBs, refer to Section 4, Additional Procedures.

1. Remove the paper guide. Pay special attention to how the sensor wires are routed to the front of the machine.

2. Turn the paper guide upside down.

   a) For the mechanical sensor:

   Insert a small flatblade screwdriver into the notch that holds the sensor in place (Figure 44, #2).

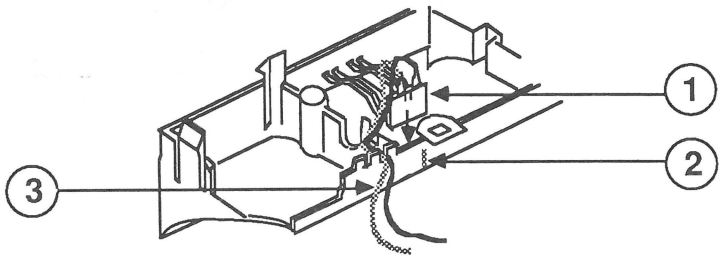


FIGURE 44

b) For the optical sensor:

Gently push the sensor from the top of the paper guide until it pops out.

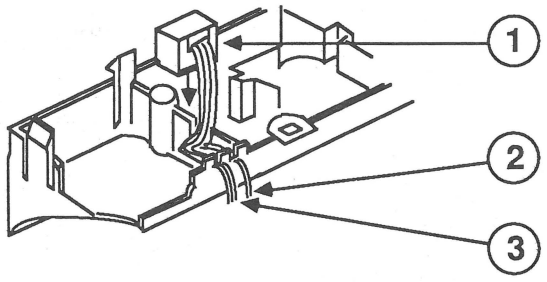


FIGURE 45

3. Remove the paper sensor.

Replace

1. Put the paper-out sensor in place.

   a) For the mechanical sensor: route the wires as shown in Figure 44, #3.

   b) For the optical sensor: route the black-and-yellow wire (shown in Figure 45, #3) and route the single wire (shown in Figure 45, #2).

2. Replace the paper guide.

❑ TRACTOR ASSEMBLY

Materials Required

#2 Phillips screwdriver, magnetized
Small Phillips screwdriver, magnetized
Small flat-blade screwdriver

Remove

1. Remove the paper cover and the tractor cover.
2. Remove the left and right support legs.
3. Remove the top cover.
4. Remove the bottom cover.

   Note: The bottom cover procedure mentioned here takes apart the rear metal portion of the bottom cover. Sections of the bottom cover are shown on the Illustrated Parts List. The plastic portion of the bottom cover will be removed in step 8.

5. If you have a late-model printer, disconnect the cable that goes from inside the right leg to the power switch assembly (attached to the frame).

   Note: If you have an early model, the cable runs from inside the right leg along the right side of the frame and is joined by the extension from another cable that connects to the transformer. (Both of these cables on earlier models disconnect at the right front of the printer, and will be disconnected in step 8.)

6. Turn the printer upright. Carefully move the carrier assembly slightly left of center to give access to the two large screws (Figure 46, #1) that hold the frame to the remainder of the plastic bottom cover. Remove the screws.

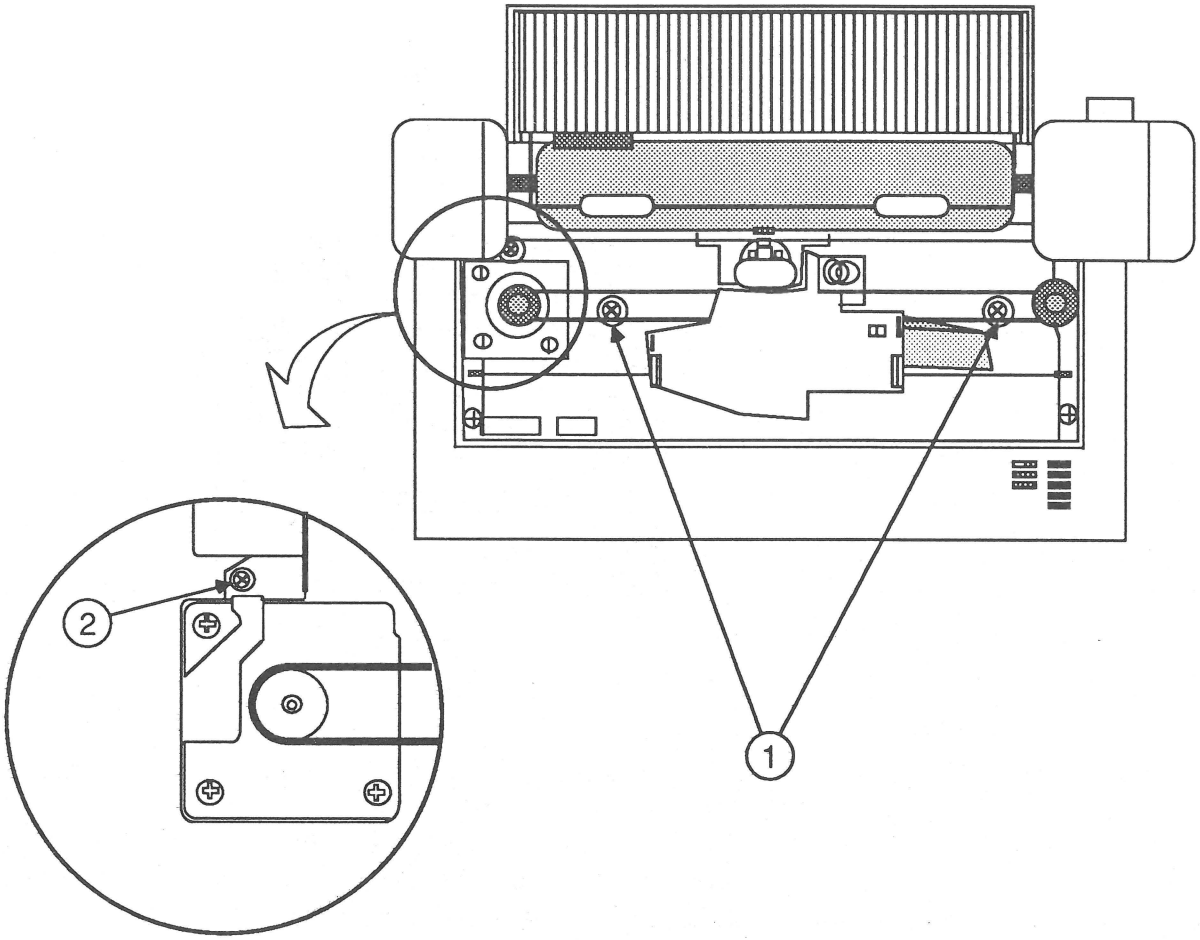


FIGURE 46

7. If there is a screw (Figure 46, #2) between the stepper motor and carrier motor housing, remove it.

   Note: On earlier ImageWriter II models, this screw does not exist.

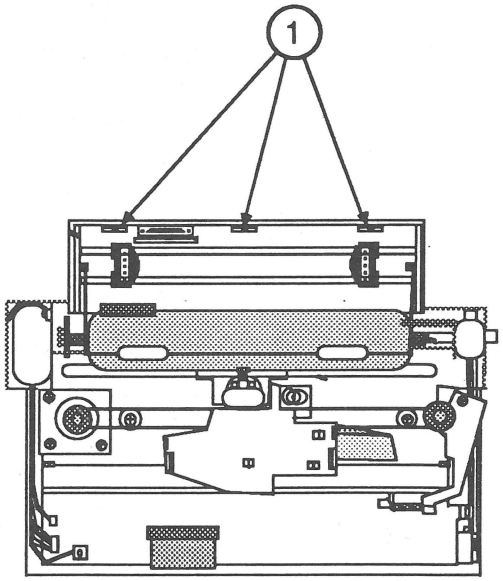


FIGURE 47

8. On later models, lift up the front of the frame and pull it toward you until it is completely out of the plastic portion of the bottom cover. If the frame does not clear the top rear of the bottom cover, push slightly at the top of the back edge above each of the three molded plastic frame holders (Figure 47, #1) of the bottom cover.

   Note: On earlier models, before you can remove the frame from the plastic portion of the bottom cover, you must disconnect the two cables mentioned in step 5 (the cables run along the right side of the frame and disconnect at the right front of the printer).

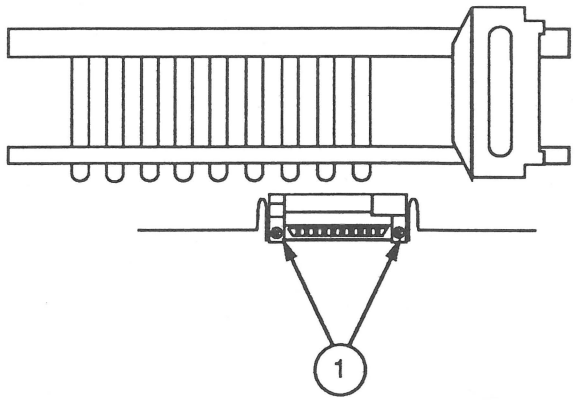


FIGURE 48

9. Turn the printer so the rear is facing you and remove the two small screws (Figure 48, #1) from the SheetFeeder connector bracket.

10. Remove the SheetFeeder connector and the metal bracket that holds the connector in place.

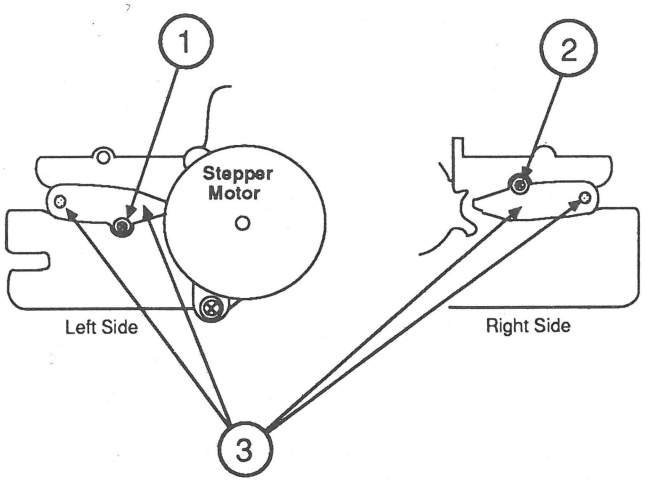


FIGURE 49

11. Turn the printer so the stepper motor is facing you and remove the screw (Figure 49, #1) that holds the tractor assembly to the metal frame.

12. Turn the printer to the right side and remove the screw (Figure 49, #2) that holds the tractor assembly to the frame.

13. Turn the printer so the rear is facing you. Hold the round rod and plastic end pieces (Figures 49, #3) of the tractor assembly and carefully pull straight toward you until the tractor assembly is free from the frame.

Replace

1. Hold the plastic end pieces (Figures 49, #3) on each end of the tractor assembly and slide the tractor assembly into the frame slot.

   Move the right tractor toward the stepper motor as far as possible. (Otherwise, the tractor may wedge between the paper guide protrusion and the square rod of the tractor assembly and prevent adjustment.)

2. Hold the tractor assembly in place and turn the printer so the stepper motor is facing you. Replace the screw (Figure 50, #1) that holds the tractor assembly to the frame.

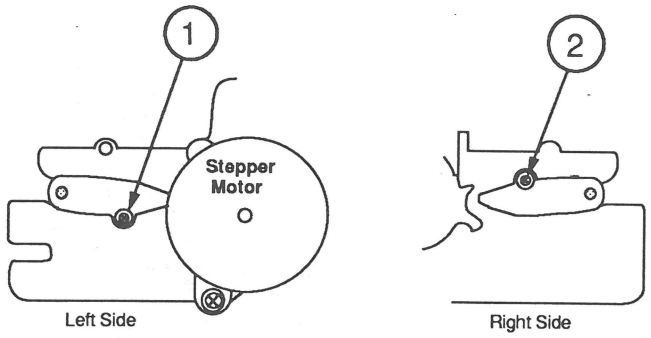


FIGURE 50

3. Turn the printer to the right side and replace the screw (Figure 50, #2) that holds the tractor assembly to the frame.

4. Place the SheetFeeder connector onto the frame support at the rear of the printer. Be sure the narrow edge of the connector (Figure 51, #1) is facing away from the printer head.

5. Place the connector bracket on top of the SheetFeeder connector so that the extension of the connector bracket (Figure 51, #2) faces the wide side of the connector and extends up into the printer and then down.

6. Replace the two screws through the bracket and SheetFeeder connector (Figure 51, #3).

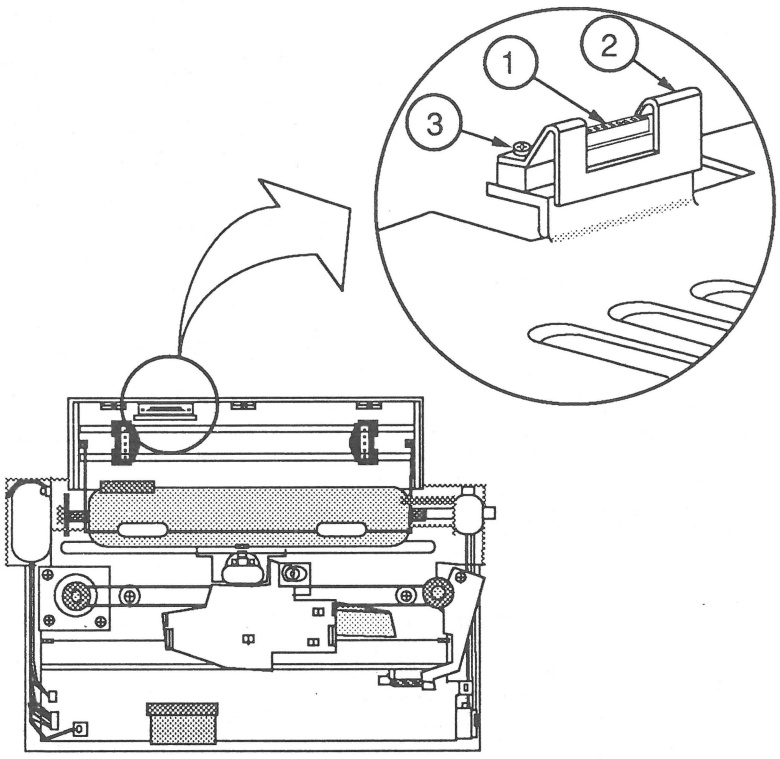


FIGURE 51

7. Place the frame into the plastic portion of the bottom cover, being careful to feed the cables between the left side of the frame and the left side of the bottom cover. The cables attached to the bottom right side of the frame, those that come from the SheetFeeder connector, and the large gray ribbon cable should be fed straight back into the opening for the metal portion of the bottom cover (yet to be replaced).

   Note: If you have an early-model printer, connect at this time, at the right front of the printer, the cable that runs to the inside of the right leg and the extension cable that connects to the cable that comes from the transformer.

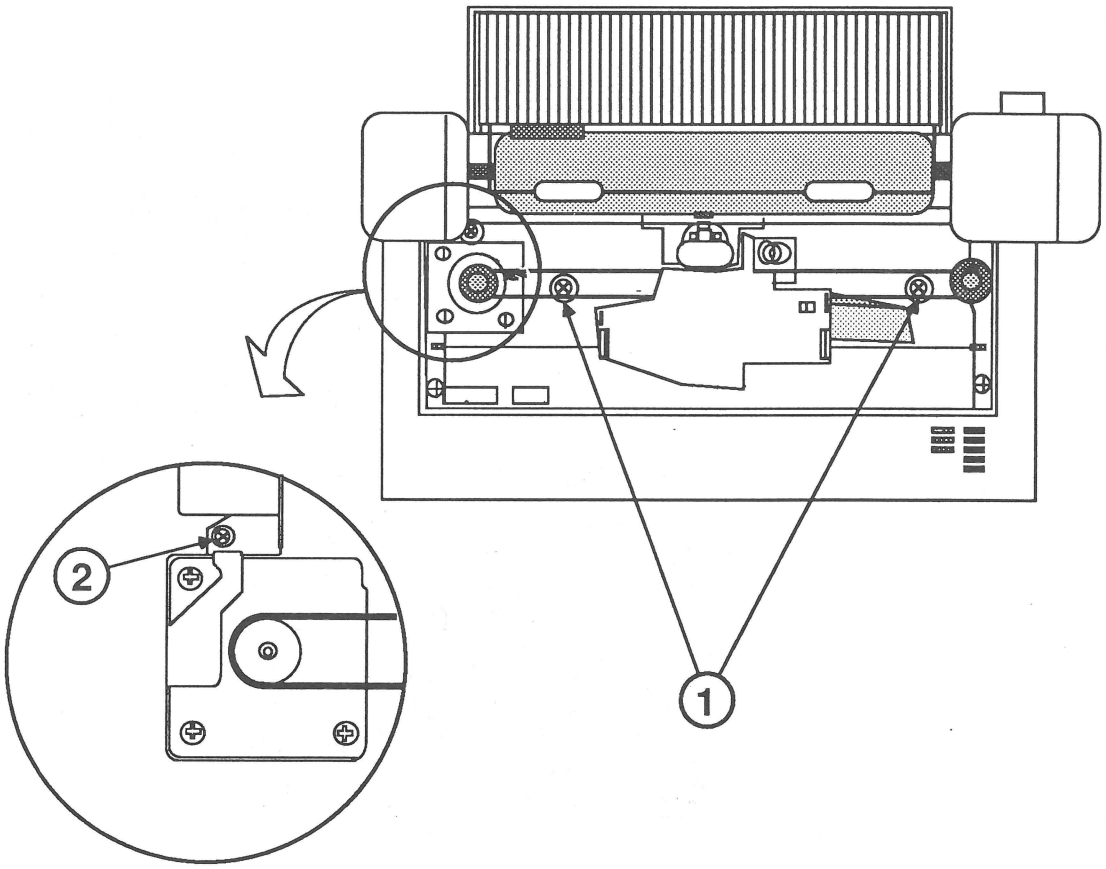


FIGURE 52

8. Replace the two large screws (Figure 52, #1) that hold the frame to the plastic portion of the bottom cover.

9. If the screw exists (it doesn't on earlier models), replace the frame screw (Figure 52, #2) between the stepper motor and carrier motor housing.

10. Turn the printer upside down.

11. On later models, connect the two-wire cable that comes from the power switch assembly to the cable that comes from inside the right leg.

12. Replace the bottom cover (metal portion).

13. Replace the left and right support legs.

14. Replace the top cover.

15. Replace the tractor cover and the paper cover.

Apple Technical Procedures

ImageWriter II

Section 3 – Troubleshooting

❑ CONTENTS

3.2	Introduction
3.2	Before You Start
3.2	How to Use the Symptom Charts
3.4	Things to Check
3.6	Symptom Table
3.10	ImageWriter II Flow Charts
3.10	Power Light Not Lit
3.12	Power Light On, No Printing
3.14	No Paper Feed
3.16	Ribbon Color Selection Fails
3.18	Print Quality Problems
3.20	Option Card Malfunctioning
3.22	Final Test

❑ INTRODUCTION

Before You Start

Read the section entitled "Things to Check" before you begin troubleshooting. **You need the information in that section to troubleshoot the ImageWriter II effectively.**

If the suggestions in "Things to Check" do not correct a problem, run the self-test (see Section 1, Basics).

How to Use the Symptom Charts

First find the symptom that most nearly describes the problem; then perform the first corrective action on the solution list. If that corrective action does not fix the problem, go to the next one. **If you replace a module and find that the problem remains, reinstall the original module before you go on to the next action.**

If the symptoms displayed by the ImageWriter II are not listed in the symptom charts, or if the system is not displaying a clearly defined problem, use the "Flow Chart" section.

How to Use the Flow Charts

Examine the printer for the symptoms listed below, and then turn to on of th seven troubleshooting flow charts for instructions. If the flow chart asks you to make a replacement or an adjustment, you can look up the procedure in the table of contents.

Examine the printer for the symptoms listed below, and turn to the appropriate flow chart for instructions. Step-by-step instructions for recommended replacements and adjustments can be found by consulting the table of contents of the appropriate sections.

> ***Note:*** Some of the flow charts have you use a multimeter to check resistance and continuity on some replaceable parts and modules. If you do not know how to use the multimeter, you will have to exchange the part in question to verify that the customer's part is bad.

Indication	Flow Chart
Power Light Not Lit	1
Power Light On, No Printing	2
No Paper Feed	3
Ribbon Color Selection Fails	4
Print Quality Problems	5
Option Card Malfunctioning	6
Final Test	7

On the page facing each of the flow charts, there are notes with additional instructions and references.

Starting at the top of a flow chart, answer the questions and proceed down the chart. When you arrive at a rectangular box containing a list of actions, perform the actions in the sequence listed. On completion, return to the preceding diamond box. **If the problem remains, reinstall the original module before you go on to the next action.**

❑ THINGS TO CHECK

There are many problems that have simple corrections listed on the following chart. It will save you time in the long run if you try these remedies before you begin troubleshooting.

Note: If an option card is installed, remove it before you begin. Then verify that the dip switch, SW2-4, is open/off.

Symptom	Check
• *Error light blinks*	1. Carrier cover securely in place. 2. Carrier cover magnet in place. 3. Left margin error occurs while printing. This error may be a software problem: try other software. 4. Option card dip switch is open/off with no card installed.
• *Select light off, error light on*	– No paper or improperly inserted paper.
• *No printing or garbled printing*	1. The interface cable between the printer and the computer is loose or disconnected. 2. DIP switches (switches 2-1 through 2-4) are improperly set.
• *Software-specific problem*	– Try a known-good piece of software.
• *Prints ok for a while, then garbage*	– Set DIP switch 2-3 to the correct serial protocol.

Symptom	Check
• *Overprinting*	– Check that the program being used is set for the correct line spacing and line length.
• *Light printing*	1. Change ribbon cartridge. 2. Adjust the impression lever (see Section 4, Adjustments).
• *Erratic carrier motion, loud hum*	– Remove black tube-shaped shipping protection from the carrier shaft.
• *Printing has squashed lines, misregistration problems when using pin feed paper*	1. For the best print quality, instruct the customer to place the stack of paper behind the printer. The paper should have a clear, unobstructed entry and exit path. 2. Be sure that the power cord or printer cable does not obstruct the paper path. 3. Avoid printing in the top and bottom one inch of the paper (the areas where the squashed line and misregistration problems will be the most apparent). 4. Try using 20-pound paper.

❑ SYMPTOM TABLE

Print Quality Problems	Solutions
• *Compressed first or second line when printing*	– Replace CPU PCB.
• *Print is darker or lighter on one side*	– Refer to Section 3, Take-Apart, for removing and installing shims.
• *Top row of dots missing on printout*	– Perform Ribbon Adjustment (refer to Section 4, Adjustments).
• *When printing from a Macintosh, characters sometimes appear smudged, or the top of form gradually creeps down the page in one-line increments*	– Verify that the ImageWriter II driver software is the most current version. If it is not, run the most current Install program and select the ImageWriter as the print driver.
• *Power light on, no printing*	1. Verify that the ribbon frame assembly is riding on the spiral ridge on the color ribbon cam (see Section 4, Adjustments). 2. Remove the dot head, and verify that the pins in the connector on the dot head PCB are not bent. 3. Go to Troubleshooting Table 2.
• *Missing dots*	1. Verify that the flexible cable is connected properly. 2. Remove the dot head, and verify that the pins in the connector on the dot head PCB are not bent. 3. Go to Troubleshooting Table 5.

Carriage Movement Problems	Solutions
• *Carriage doesn't move; LEDs are not lit*	1. Replace the drive PCB. 2. Replace the transformer. 3. Replace the filter assembly.
• *Carriage doesn't move; LEDs are lit*	1. Replace the CPU PCB. 2. Replace the drive PCB.
• *Carriage assembly moves to the left and does not return to center*	1. Check the switch on the print head PCB. If the switch is frozen, replace the print head PCB. 2. Replace the CPU PCB. 3. Replace the print head PCB. 4. Replace the flexible ribbon cable. 5. Replace the drive PCB.
• *Carriage moves to the left and hums very loudly*	1. Ensure that the flexible ribbon cable is properly connected to the drive PCB and to its connector under the carriage assembly. 2. Replace the flexible ribbon cable. 3. Replace the print head PCB.
• *Self-test after take-apart produces no carrier movement (panel lights on)*	1. Remove the bottom cover to ensure that the wires to the carrier motor are not pinched. If wires to the carrier motor are worn, replace them. 2. Replace the fuse on the drive PCB. 3. Replace the drive PCB.
• *Carriage assembly grinds or is hard to move*	1. Remove the bottom cover to ensure that the wires to the carrier motor are not pinched. If wires to the carrier motor are worn, replace them. 2. Replace the fuse on the drive PCB. 3. Replace the drive PCB.

Paper Feed Problems	Solutions
• *Grinding during paper feed*	1. Remove the platen knob to verify that there are no obstructions in the gearing beneath the knob. 2. Adjust the paper guide (refer to Section 4, Adjustments). 3. Replace the paper feed motor. 4. Replace the drive PCB.
• *Paper-out sensor is interfering with paper path; left side of paper fits "tighter" under the platen than does the right side*	– Bend the mechanical paper sensor slightly lower into the platen cradle.

Miscellaneous Problems	Solutions
• *Hexadecimal data is printed*	– Power the printer off then on.
• *IC3 on Drive PCB is visibly blown*	– Replace linefeed motor, drive PCB, and CPU PCB.

WARNING: *Check IC3 on the Drive PCB. If it is visibly blown, replace the linefeed motor, drive PCB, and CPU PCB. Failure to replace all three modules may result in additional blown modules.*

• *Power supply keeps going bad*	– Verify that the cut sheet feeder wires are not pinched. If the wires are pinched, lift the chassis and reposition them.

❑ IMAGEWRITER II FLOW CHARTS

Power Light Not Lit

1. To check the fuses (printer should be off):

IMPORTANT: *Remove the mechanical assembly from the printer before you check the fuse on the noise filter PCB assembly.*

   a) Set the digital multimeter to measure 200 ohms resistance.

   b) Remove and check the fuses on the drive PCB one at a time.

   c) All fuses should measure 0.00 (indicating continuity).

2. To check the power switch *before removal* (printer should be off):

   a) Disconnect the plug-in connectors running from the power switch to the right support leg.

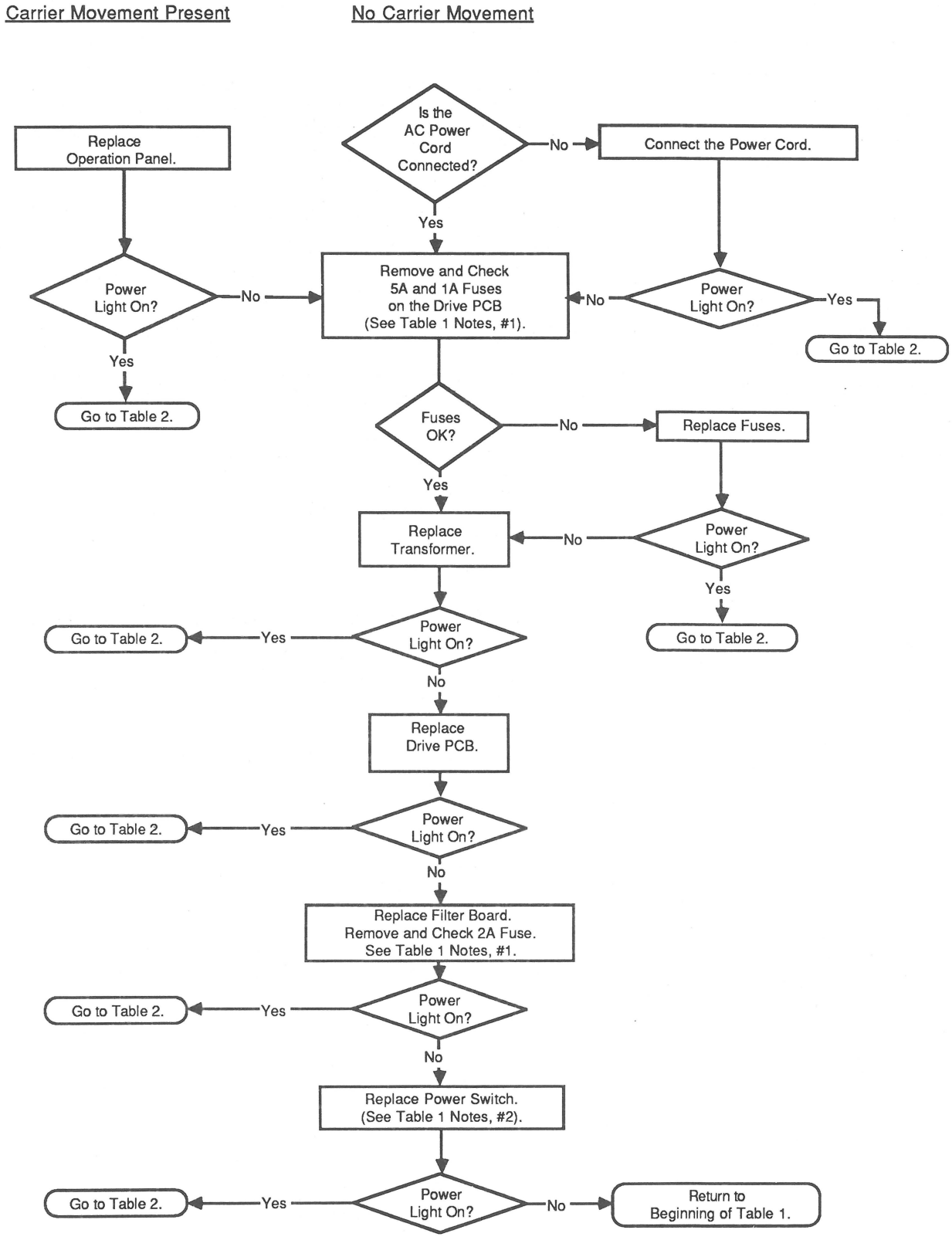
   b) Set the digital multimeter to measure 200 ohms resistance.

   c) Insert the probes into the connectors, making sure you test white wire with white wire, and black wire with black wire.

      When the switch is up or in the off position, you should get a reading of 1, indicating there is no connection. When the switch is down or in the on position you should get a reading of 0 for continuity.

   d) Insert the probes into the connectors, checking black wire with white wire. A reading of 1, regardless of the position of the switch, should be displayed.

Table 1
Power Light Not Lit



Power Light On, No Printing

1. To check the Form Feed switch on the operation panel (printer should be off):

   a) Set the multimeter to measure 200 ohms resistance.

   b) Place the probes on pin 12 and pin 13 of the operation panel connector. The reading should show no connection (1).

   c) Depress the Form Feed switch. The reading should show continuity (0.00).

2. To check the flexible cable and the Head PCB:

   a) Detach the flexible cable from the drive board.

   b) Locate the home position switch (under the left side of the ribbon carrier on the Head PCB).

   c) Set the digital multimeter to measure 200 ohms resistance.

   d) Place the probes on pin 10 and pin 12 on the flexible cable.

   e) Push the home position switch on the Head PCB. The reading should be 0.00 when the switch is depressed. When the switch is released, the reading should be 1.

3. Manually move the carrier back and forth. If it will not move, inspect the following:

   a) Check the ribbon cartridge to be sure the ribbon is wound when the knob is turned in the direction of the arrow.

   b) Check the carrier shaft and carrier belt for damage and foreign materials.

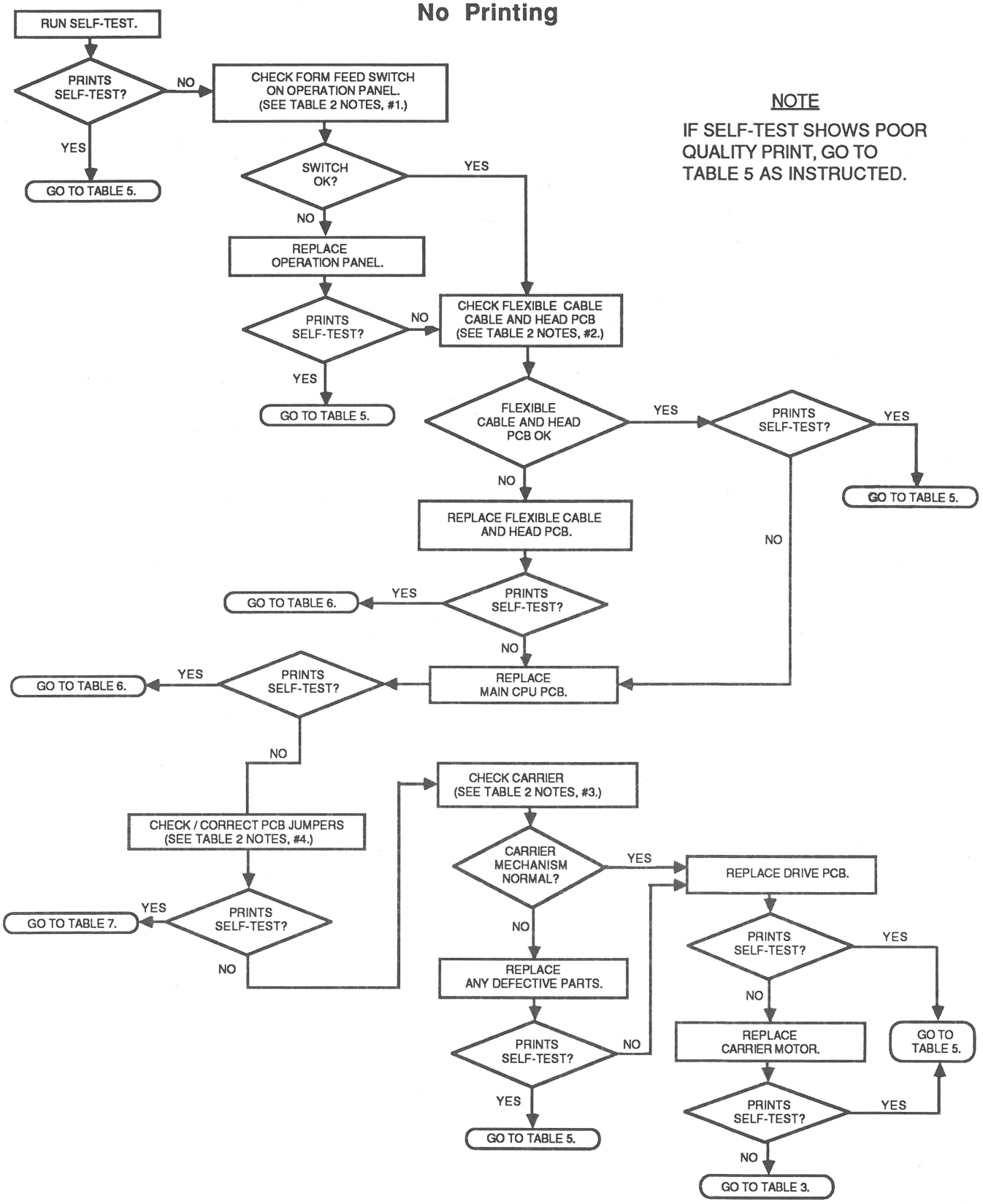
   c) Check the ribbon wire for dislocation and damage.

   d) Perform carrier shaft maintenance (see Section 1, Basics).

4. To check for correct jumper position on the PCB board, see "Paper Sensor and Logic Board Compatibility" in Section 5, Additional Procedures.

TABLE 2

Power Light On
No Printing



NOTE

IF SELF-TEST SHOWS POOR QUALITY PRINT, GO TO TABLE 5 AS INSTRUCTED.

No Paper Feed

1. To check the paper feed mechanism, insert paper and turn the platen knob. Make sure the gears to the left of the platen mesh properly.

2. To check the form-feed and line-feed switches on the operation panel (printer should be off):

   a) Set the digital multimeter to measure 200 ohms resistance.

   b) Place the probes on pin 12 and pin 13 of the operation panel connector. The reading should show no connection (1).

   c) Depress the form feed switch. The reading should show continuity (0.00).

   d) Place the probes on pin 11 and pin 13 of the operation panel connector. The reading should show no connection (1).

   e) Depress the line-feed switch. The reading should show continuity (0.00).

3. To check the paper feed motor (printer should be off):

   a) Set the digital multimeter to measure 200 ohms resistance.

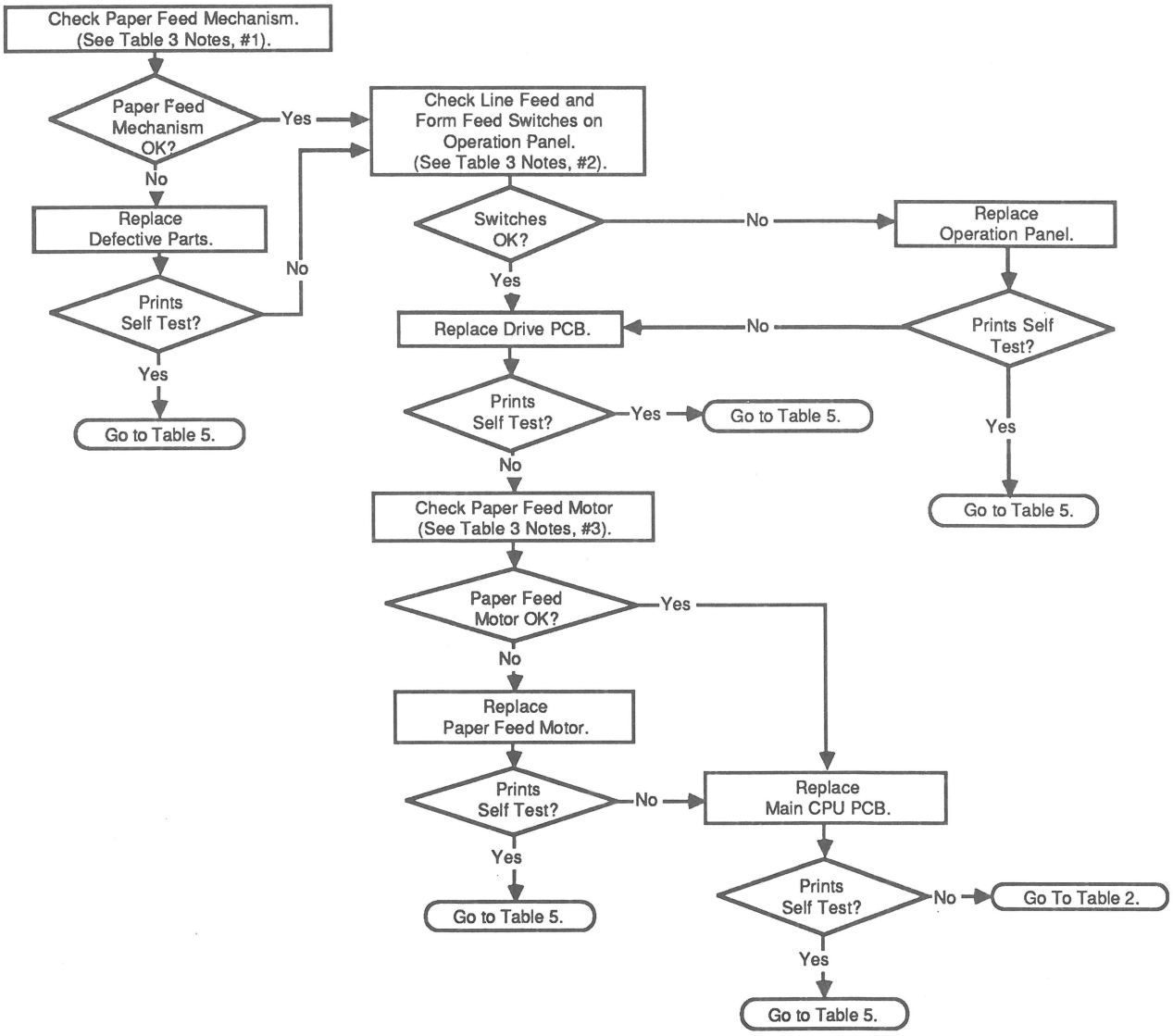
   b) At the cable connector end (disconnected from the drive PCB), check the resistance values between pins 6 and 4, 6 and 2, 5 and 1, and 5 and 3 (pin 1 is the black wire). The value for each reading should be approximately 22 ohms.

   c) Check the resistance values between pins 3 and 1, and 2 and 4. The value for each reading should be approximately 44 ohms.

Table 3
No Paper Feed
(Power Light On)

Note

If Self Test Shows Poor Quality Print Go to Table 5 as Instructed.



Ribbon Color Selection Fails

1. Examine the color ribbon assembly (printer should be off). Verify that the black tabs on the ribbon plate ride on the spiral ridge of the ribbon cam.

   Verify that the ribbon cam is tight. Also check the copper tab mounted behind and below the ribbon cam. When the cam is all the way up, the vertical ridge on the cam should hit the tab. If the color ribbon assembly is loose, the ribbon cam is misaligned. For color printing adjustment procedures, turn to Section 4, Adjustments.

2. Check the flexible cable and the ribbon motor (printer should be off):

   a) Detach the flexible cable from the drive PCB.

   b) Set the digital multimeter to measure 200 ohms resistance. Detach the flexible cable from the drive PCB.

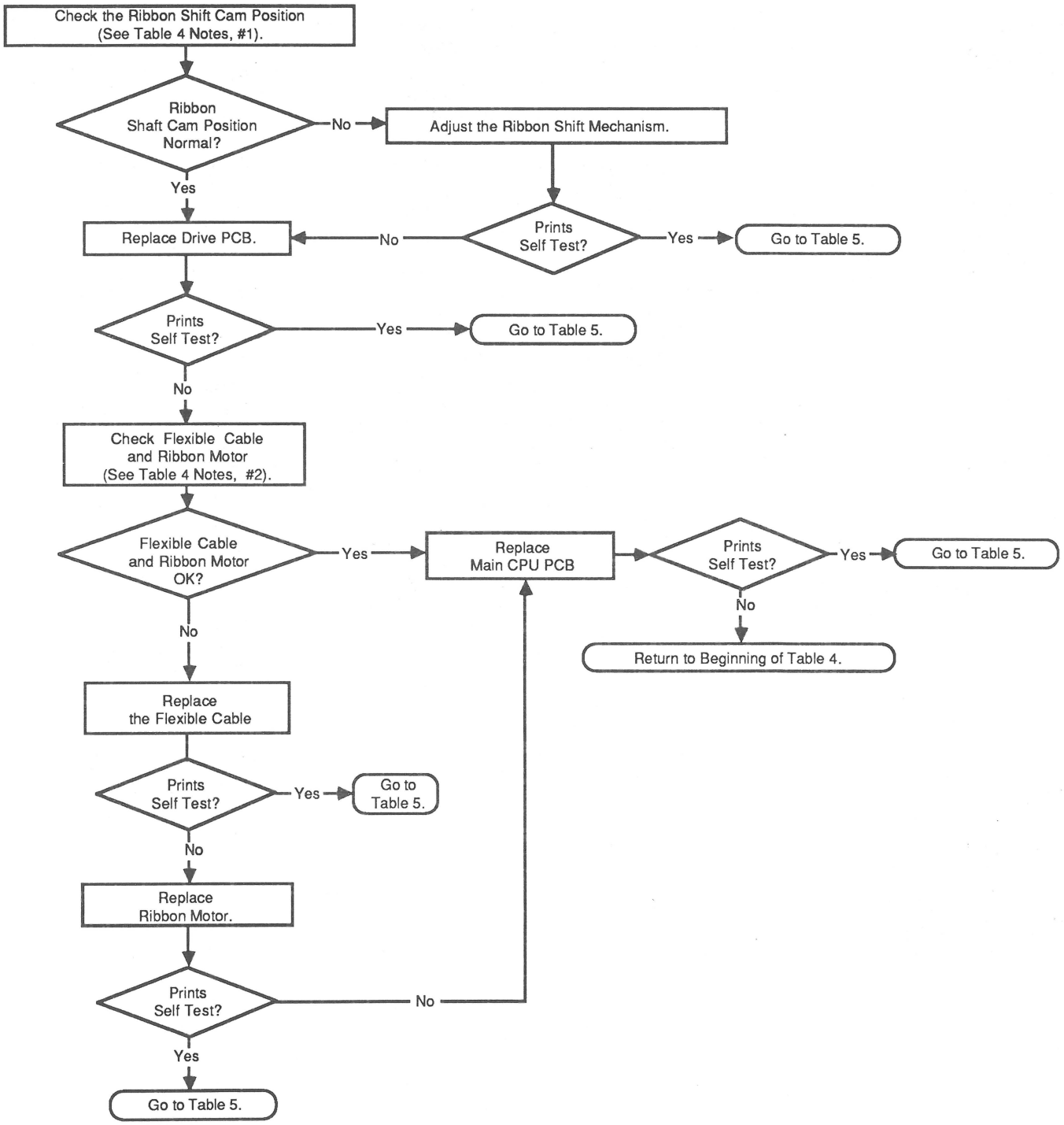
   c) On the flexible cable, check the resistance between pins 3 and 7, 5 and 7, 4 and 8, and 6 and 8. Each should read approximately 120 ohms.

   d) Check the resistance values between pins 3 and 5 and pins 4 and 6. Each should read approximately 240 ohms. If the readings are not approximately 240 ohms, the carrier ribbon will drive down but not up. Replace the flexible cable.

Table 4
Ribbon Color Selection Fails

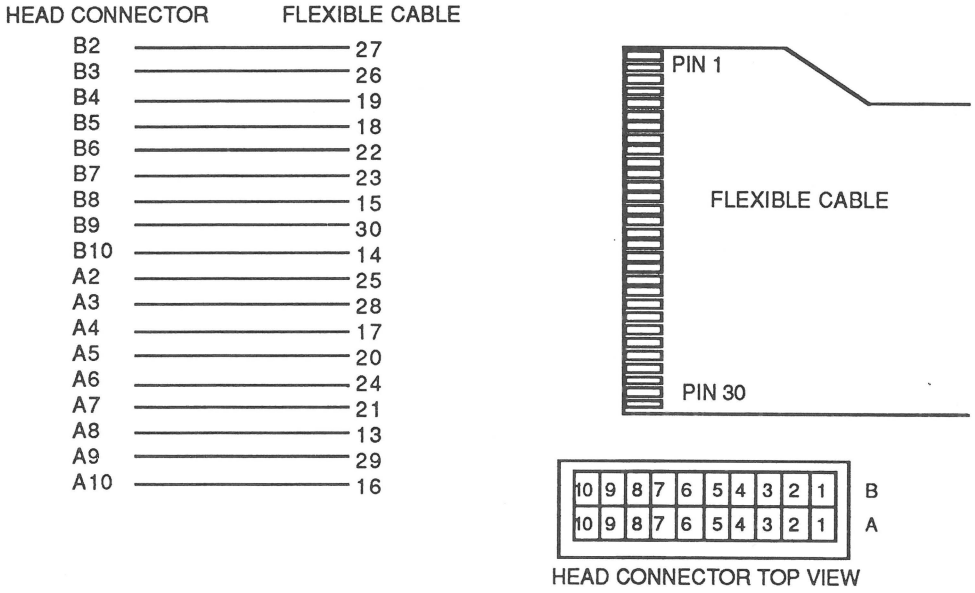
Note

If Self Test Has Poor Quality Print Go to Table 5 as Instructed.



Print Quality Problems

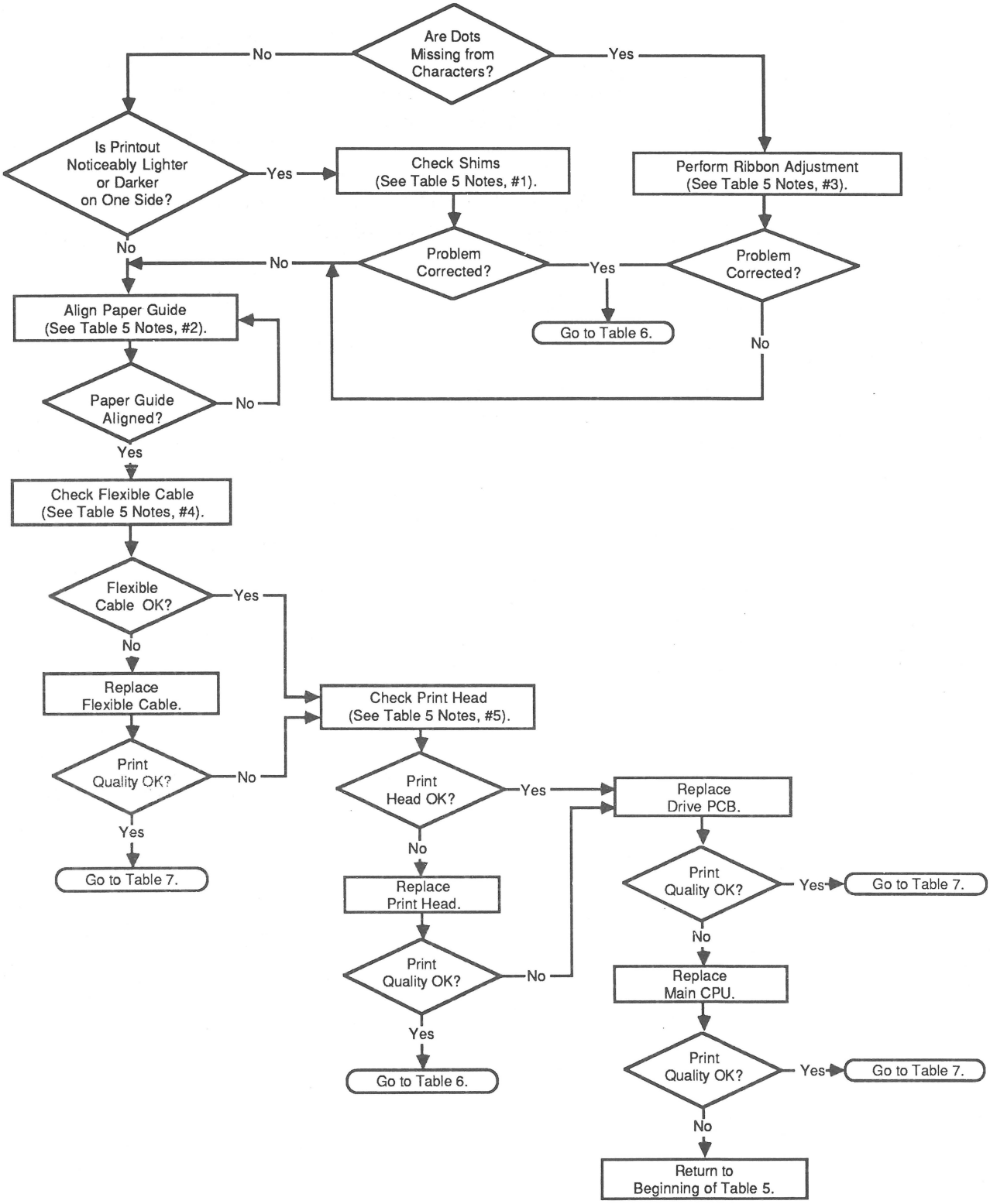
1. Check the shims (refer to Section 3, Take-Apart).
2. Check the paper guide positioning (refer to Section 4, Adjustments).
3. Perform the ribbon adjustment (refer to Section 4, Adjustments).
4. To check the flexible cable (printer should be off):
   a) Detach the flexible cable from the drive PCB and remove the print head.
   b) Set the digital multimeter to measure 200 ohms resistance.
   c) Check for continuity between the pins listed and shown below:



5. To check the print head:
   a) Set the digital multimeter to measure 200 ohms resistance.
   b) Remove the print head and place it PCB-side-down with the edge connectors facing you. Place one probe of the multimeter on each side of the far-right metal finger of the print head. The resistance value should be approximately 3 ohms.

Table 5

Print Quality Problems
(Poor Quality, No Print, or Dots Missing)



Option Card Malfunctioning

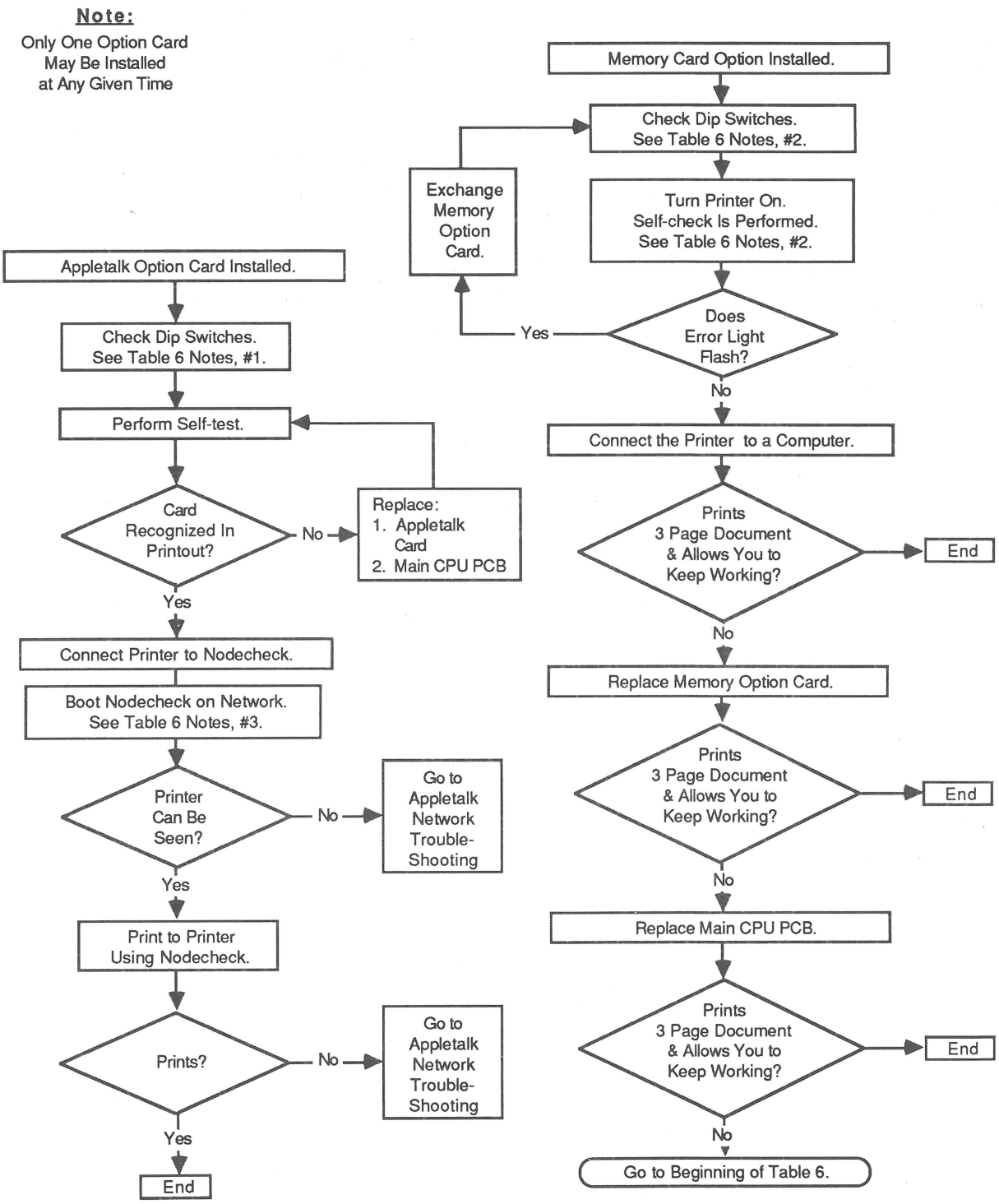
1. ImageWriter II switch 2-4 **must** be in the closed/on position when an Option Card is installed.

2. If the Memory Option Card is installed and switch 2-4 is set correctly, a RAM verification test is performed when the printer is turned on. If the printer comes ready, the RAM on the Memory Option Card is good.

3. If you do not know how to use NodeCheck, see the *AppleTalk Cables and Connectors Technical Proceedures*, Diagnostics Section.

Table 6

Option Card Malfunctioning

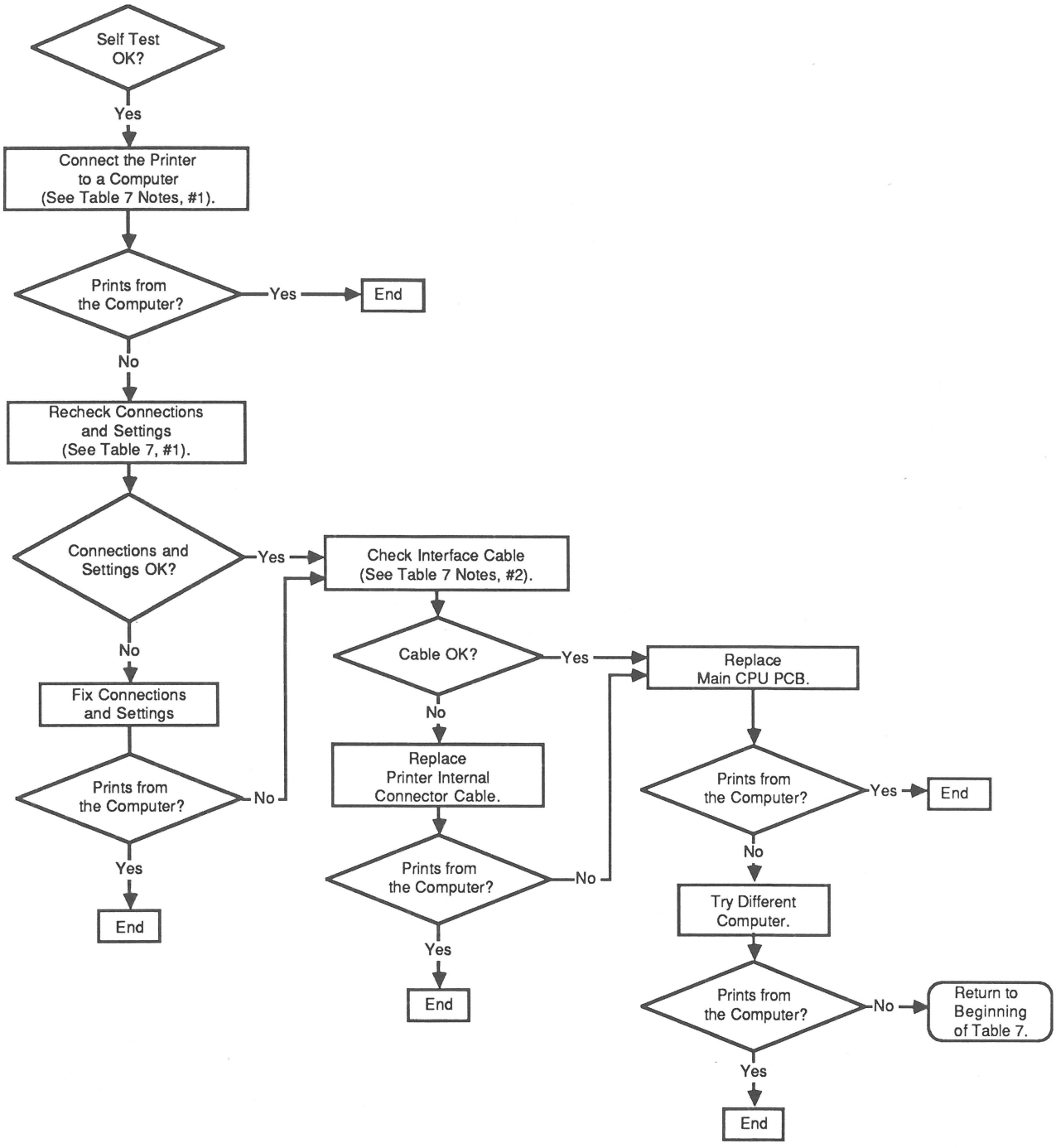


Final Test

1. Refer to the *Technical Procedures Peripheral Interface Guide* for directions on setting the printer switches correctly.

2. Check the *ImageWriter II Owner's Manual* for more information on the correct cable to use.

Table 7
Final Test



Apple Technical Procedures

ImageWriter II

Section 4 – Adjustments

❑ CONTENTS

4.3 Ribbon Assembly
4.4. New Assembly
4.6 Old Assembly
4.7 Firing Hammer
4.8 Impression Lever
4.9 Carrier Belt
4.10 Paper Guide
4.11 Apple II Peripherals Diskette

❑ RIBBON ASSEMBLY

This adjustment should be performed when

- The color print function fails
- The color ribbon assembly has been replaced
- Dots are missing or no printout is seen when using a black ribbon

There are three possible versions of the ribbon assembly currently in circulation: two newer assemblies and one older assembly. If you have an ImageWriter II with a serial number of 244451 or above, you have one of the newer assemblies and will have the color ribbon assembly shown in Figure 1. One of the assemblies is adjustable; the other isn't. To find out which assembly you have, try following the "New Assembly" procedure. If you cannot turn the top of the assembly (do not force it or the red locking ring), then you have a nonadjustable version of the assembly and you must install a new assembly. If the top assembly turns, then follow the rest of the procedure for the new assembly. The older version is shown in Figure 2. For this version, follow the "Old Assembly" procedure. Before you begin either procedure, perform the steps below:

1. Run the self-test and examine the colors printed. The colors should be black, yellow, red, blue, orange, green, and purple. You should see no overlapping.

   The self-test should produce one line of each color and then repeat the same sequence of colors until stopped. If the test doesn't perform as described, or if the colors overlap, continue with step 2.

2. Switch off the printer and remove the paper cover.

New Assembly

If you have the new version of the color ribbon assembly (serial number 244451 or above), perform the following steps:

1. Remove the ribbon (access to the ribbon adjustment is easier with the ribbon removed, although it is not absolutely necessary).

2. Locate the color ribbon assembly (Figure 1, #1).

3. In this step you are going to turn the top assembly to make the adjustment.

   a) First, to determine which way to turn the top assembly, examine the self-test printout. (If the adjustment is correct, the first line is black.) If the bottom half of the letters are missing in the first (black) line, turn the top assembly clockwise.

      If the first line is printed with the top half of the letters missing (or half blue), turn the top assembly counterclockwise.

      Note: Before you begin the adjustment, push down the red locking ring (Figure 1, #2), and then hold it while making the adjustment. The locking ring prevents the adjustment from changing once it is set.

   b) Grasp the top of the assembly—the part that has the arrow imprinted on it (Figure 1, #3)—and turn the top in the correct direction two full turns. (Two turns are recommended to start with; it is possible that more or fewer than two turns will be needed to rectify the condition.)

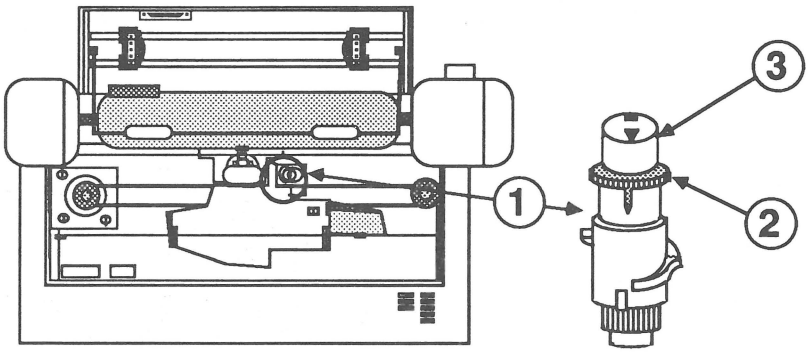


FIGURE 1

4. Reinstall the ribbon and the top cover, and rerun the test.

5. Check the print results to see if the condition has improved, deteriorated, or has stayed the same.

6. Repeat steps 3 and 4 until all the colors are solid, without any overlapping—or, if using a black ribbon only, until no dots are missing.

Old Assembly

If you have an older version of the color ribbon assembly, perform the following steps:

1. Locate the color ribbon assembly (Figure 2, #1).

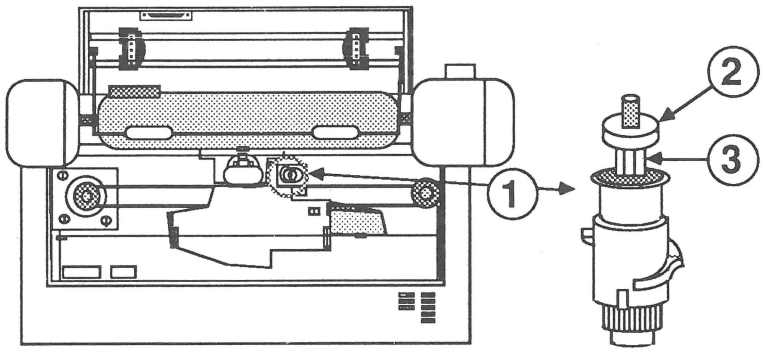


FIGURE 2

2. Loosen the lock nut (Figure 2, #2), and turn the adjustment nut (Figure 2, #3) one-half turn. To determine which way to turn the adjustment nut, examine the self-test printout. The first line should be black.

   If the bottom half of the letters are missing in the first (black) line, turn the adjustment nut clockwise.

   If the first line is printed with the top half of the letters missing (or half blue), turn the adjustment nut counterclockwise.

3. Tighten the lock nut. Run the self-test and examine the printout. Repeat step 2 if the self-test is overlapping. This self-test may need to be repeated several times.

4. When the colors are printed correctly with no overlapping, the adjustment is complete.

❑ FIRING HAMMER

The firing hammer adjustment should only be done when the carrier belt, carrier shaft, carrier motor, or PC board is replaced.

1. Connect the printer to a computer.

2. Power on the printer and the computer.

3. Print a few lines of the capital letter "H." Check the printed letters for any misalignment. See Figure 3 for an example of alignment.

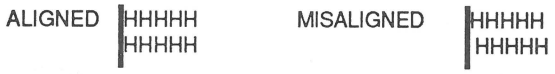


FIGURE 3

4. **If the letters are misaligned**, remove the carrier cover and change the settings of DIP switches 2-5 and 2-6. Change only one switch at a time.

5. Perform step 3 again. Repeat the procedure until the lines of the capital letter "H" are aligned.

❑ IMPRESSION LEVER

The impression lever is located under the carrier cover, to the extreme right (see Section 3, Take-Apart, for more information). This lever (Figure 4, #1) moves the dot head away from or closer to the platen. Adjust the position of the lever if the print quality is too light or too dark.

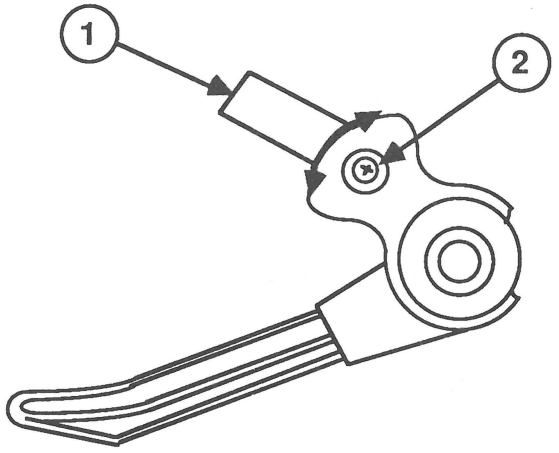


FIGURE 4

If the print is still too light or too dark after you have moved the impression lever, adjust the lever using the adjustment screw (Figure 4, #2).

❑ CARRIER BELT

The adjustment screw, which increases or decreases the amount of tension on the carrier belt, is located under the carrier cover, to the right (Figure 5, #1).

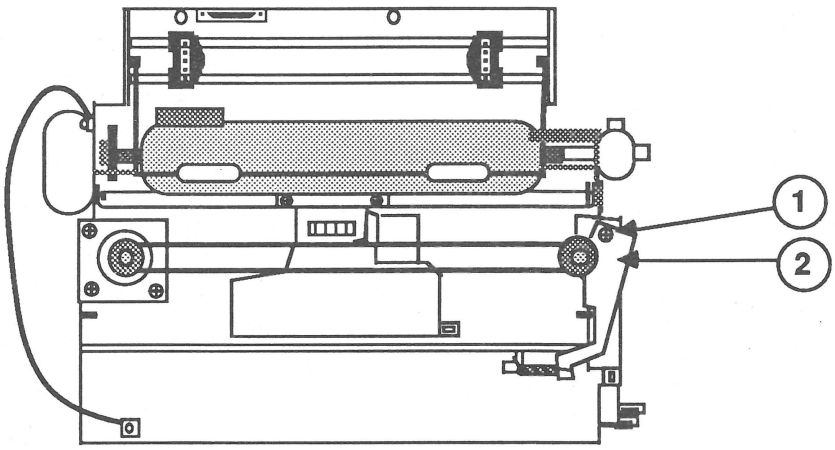


FIGURE 5

To adjust the carrier belt, loosen the adjustment screw and push the metal plate (Figure 5, #2) below the screw to the left until the tension on the carrier belt is as loose as you want it.

❑ PAPER GUIDE

To adjust the paper guide, loosen the two screws (Figure 6, #1) and slide the paper guide either forward or backward until the gap is the correct width; then tighten the screws.

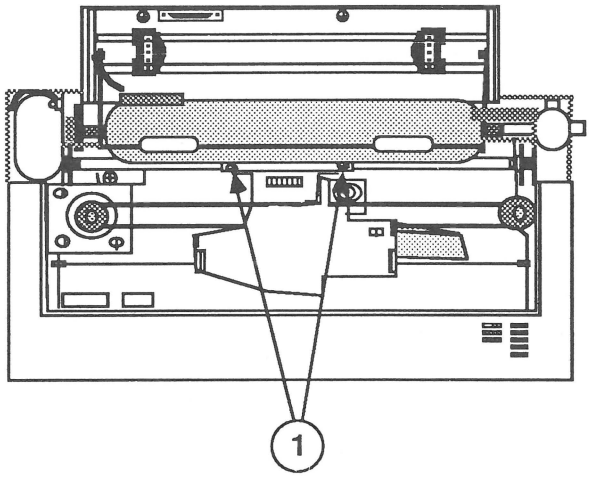


FIGURE 6

To verify that the paper guide is adjusted correctly, the impression lever should be all the way forward. When it is correctly positioned, the paper guide will move approximately .0005 inches when you press it toward the platen at the center. Verify this by rolling two sheets of copy paper under the platen. The paper guide should then be snug with little or no movement toward the platen.

❑ APPLE II PERIPHERALS DISKETTE

The *Apple II Peripherals Diskette* will perform the following tests:

- Character Set
- Alternate Sets
- Custom Character
- Graphic Images
- Margins/Tabs
- Registration (Firing Hammer)
- Color

The two tests used for adjustment purposes are the Registration (Firing Hammer) and the Color tests. If you do not have the diskette, use the procedures in this section to make the necessary adjustments.

Apple Technical Procedures

ImageWriter II

Section 5 – Additional Procedures

❑ CONTENTS

5.2 Shims
5.2 Materials Required
5.3 Check the Gap
5.4 Install
5.5 Remove
5.6 Paper Sensor and Logic Board Compatibility
5.6 Identification
5.6 Logic Boards
5.8 Optical Sensor Kit Assembly
5.8 Materials Required
5.8 Disassembly
5.18 Reassembly–Part 1 Optical Assembly
5.20 Reassembly–Part 2 Logic Board Modification
5.23 Reassembly–Part 3 Remaining Printer Parts

Note: If a step is underlined, detailed instructions for that step can be found in Take-Apart.

❑ SHIMS

A shim is a small 3-sided metal piece with two holes on one side (Figure 1). The shim is used to correct the distance between the print head and the platen.

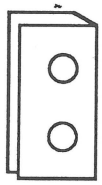


FIGURE 1

IMPORTANT: *Before performing this procedure, check the cam washer on the left side of the carrier shaft to be sure it is in position (Figure 2). The narrower part of the hole in the cam should be in the top position when placing the cam on the carrier shaft. Refer to Section 2, Take-Apart, "Carrier Block Assembly and Print Head PCB," for complete instructions.*

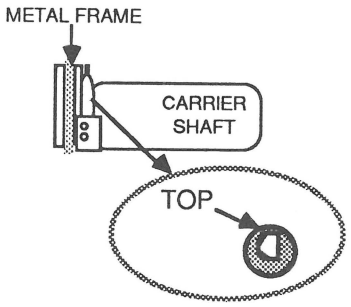


FIGURE 2

Materials Required

Shims (.002 inches, .004 inches, and .008 inches)
Feeler gauge
Phillips screwdriver
Small needlenose pliers

Check the Gap

1. Remove the paper cover and ribbon cartridge.

2. Gently pull the impression lever up, so that the dot head is in the closest position.

   Note: The recommended gap for the following readings should be approximately .013 inches plus or minus .002 inches (0.33 mm).

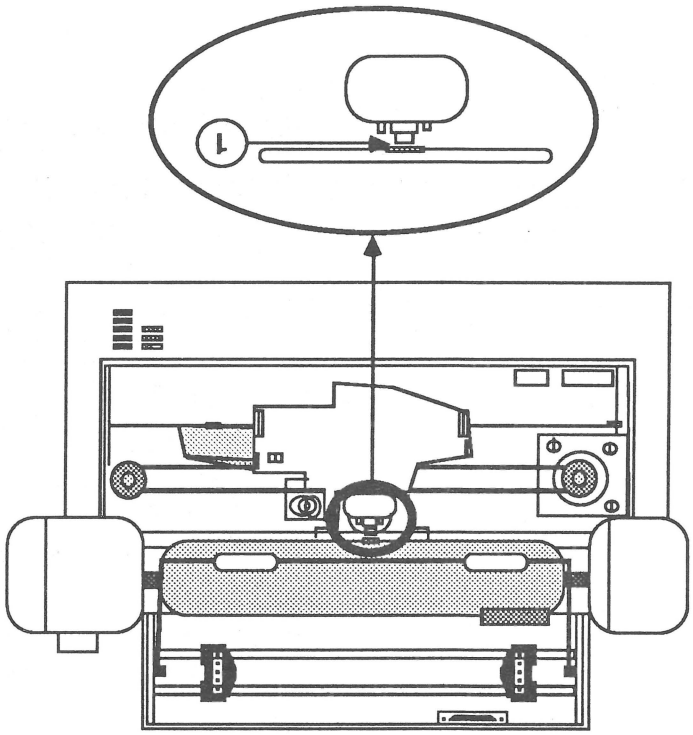


FIGURE 3

3. Push the carrier assembly to the far right. Then, using a feeler gauge, measure the gap between the front of the printhead and the metal shield on the paper guide (Figure 3, #1). Record the measurement.

4. Push the carrier assembly to the far left. Then use the feeler gauge to measure the gap between the front of the printhead and the metal shield on the paper guide. Record the measurement.

5. Subtract the right-side gap (measured in step 3) from the left-side gap (measured in step 4).

   - If the difference is a positive number, go to "Install."
   - If the difference is a negative number, go to "Remove."

Install

To install a shim:

1. Select a shim whose thickness is closest to the difference calculated.

   a) .002 inches (0.05 mm)
   b) .004 inches (0.1 mm)
   c) .008 inches (0.2 mm)

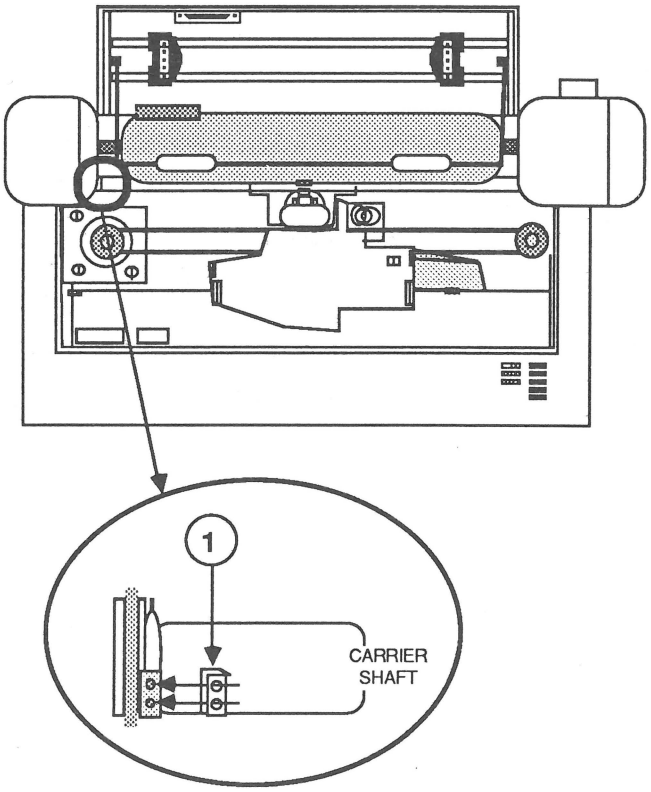


FIGURE 4

2. Push the carrier shaft toward the rear of the machine. Using needlenose pliers, install the shim on the left side of the carrier bar by inserting the two protruding tabs into the holes on the shim (Figure 4, #1). Slide the shim into position. Release the carrier shaft.

3. Verify that the gap is now correct.

4. Replace the ribbon cartridge and the paper cover.

5. Perform the self-test.

Remove

To remove a shim:

1. Look at the left side of the carrier shaft (Figure 4, #1).

   - If there is a shim installed, remove it with needlenose pliers.

   - If there is no shim installed, be sure the cam washer on the left side is positioned correctly.

2. Verify that the gap is now correct.

3. Replace the ribbon cartridge and the paper cover.

4. Perform the self-test.

❑ PAPER SENSOR AND LOGIC BOARD COMPATIBILITY

In February 1987 a new logic board, paper sensor, and paper-empty guide were implemented in the ImageWriter II. The following information explains how to identify these new components and how to resolve the compatibility issues.

Identification

There are two ways to identify the paper sensor:

1. Look at the left side of the platen assembly.

   - If there **is** a paper-empty plate (Figure 5, #1), the mechanical paper sensor is installed.
   - If there is **no** paper-empty plate, the optical sensor is installed.

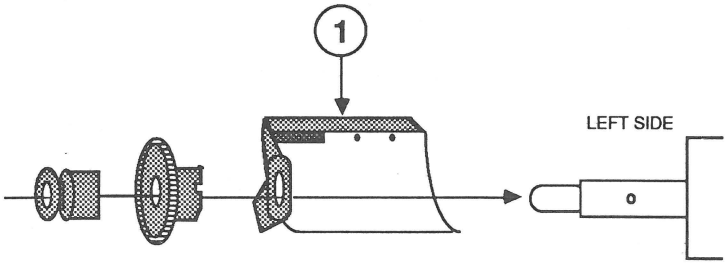


FIGURE 5

2. Examine the logic board.

   - If it is an old version, it is a mechanical paper sensor.
   - If it is a new logic board, check the selector switch setting and the connector (CN9 or CN11) as explained below.

Logic Boards

There are two versions of the main CPU PCB. The type of paper sensor in the machine reflects which version may be installed.

The new logic board supports both paper sensors and has:

- A selector switch that allows this board to be used with both the mechanical and the optical paper sensor (Figure 6, #1). If a mechanical paper sensor is installed, the jumper should be on pins 1 and 2. If an optical paper sensor is installed, the jumper should be on pins 2 and 3.

- An extra connector, CN11, that is used for the optical paper sensor (Figure 6, #2). Connector CN9 is used for the mechanical paper sensor (Figure 6, #3).

- A new ROM version that supports both paper sensors.

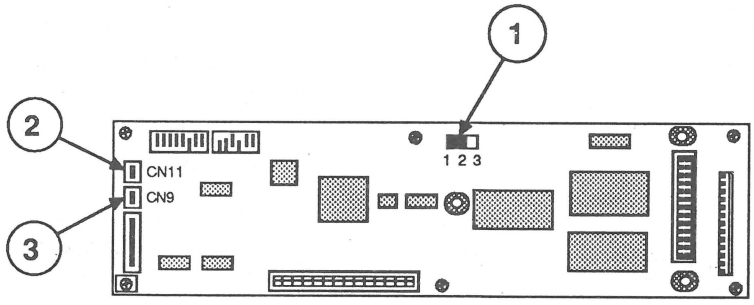


FIGURE 6

The old logic board only supports the mechanical paper sensor unless it is modified. See the Optical Sensor Kit Assembly procedure, which follows.

❑ OPTICAL SENSOR KIT ASSEMBLY

The optical sensor works with either the new CPU PCB or the old one. For the optical sensor to work with the old logic board, you must modify the logic board by adding the daughter board from the optical sensor kit.

WARNING: *This installation involves soldering a jumper wire onto a four-layer board. If you are not an experienced solder technician, do not attempt this procedure.*

Procedures for steps that are underlined can be found in Section 2, Take-Apart.

Materials Required

ImageWriter II printer
ESD-safe workstation
#2 Phillips screwdriver
#1 Phillips screwdriver
#2 flathead screwdriver
Double-ended scribe
1/16-inch or 2-mm pin punch
Soldering iron

Disassembly

1. Before beginning:

   a) Set up an ESD–Safe workstation and use ESD safety measures throughout the following procedure. (Refer to *You Oughta Know Technical Procedures.*)

   b) Verify printer functions by running self-test and repair any fault conditions before continuing.

2. Remove the power cord from the printer.

3. Remove the paper, the ribbon, and the tractor covers.

4. Remove the ribbon cartridge and the print head (Figure 7 #1).

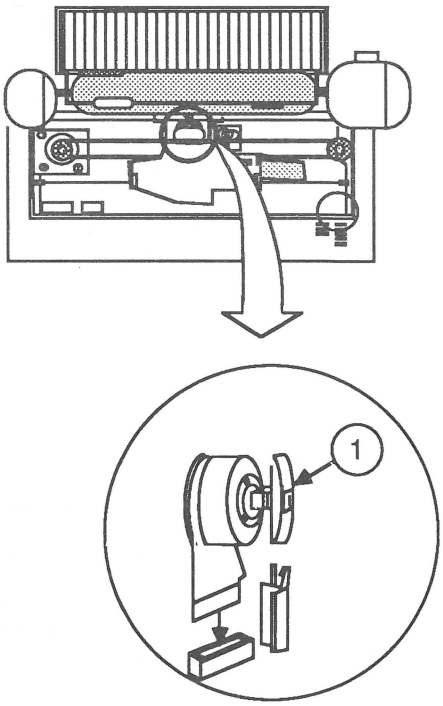


FIGURE 7

5. Remove the platen knob (Figure 8, #1) and the paper release lever (Figure 8, #2).

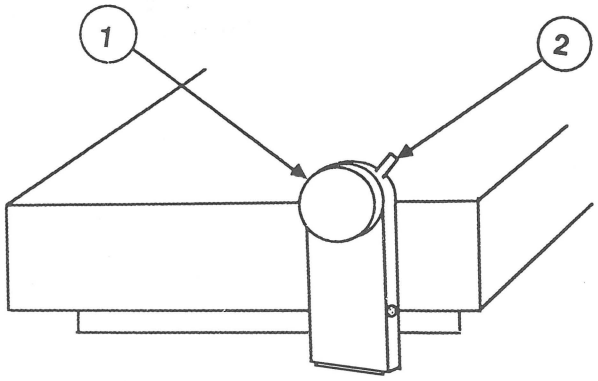


FIGURE 8

6. Push the carriage assembly all the way to the left side of the printer.

7. Loosen the two screws (Figure 9, #1) that secure the front cover, and remove the cover.

8. Be sure to detach the control panel cable from its connector (Figure 9, #2) on the right side of the main logic board.

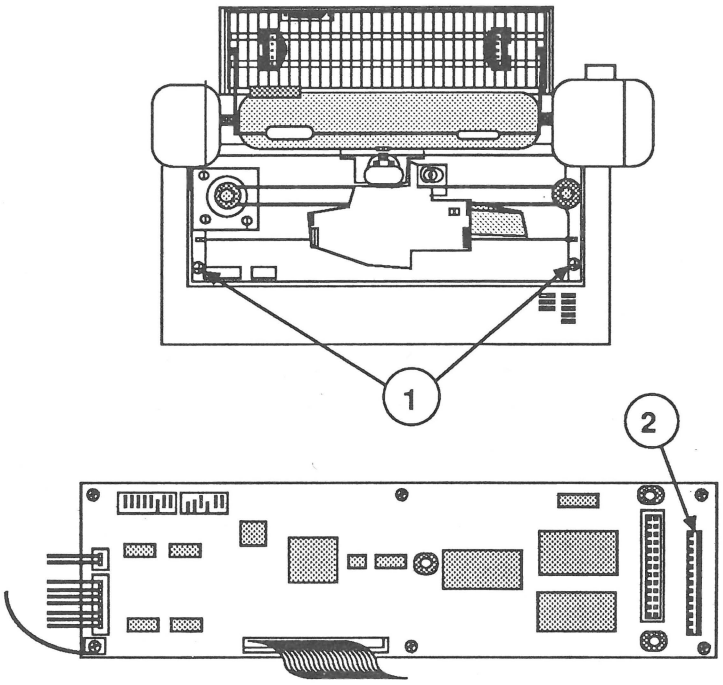


FIGURE 9

9. Remove the two screws (Figure 10, #1) that hold the paper guide in place, and remove the paper guide.

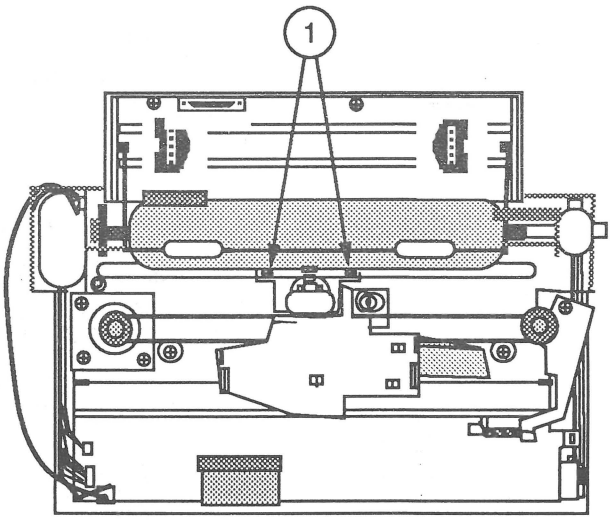


FIGURE 10

10. Turn the printer up so that it rests on its front side and the screws holding the right and left support legs face you. Remove the two screws and the support legs by pulling the legs toward you and then out. Slide the AC socket out of the right leg and the pin socket from the left leg. Bring the printer back down to its operating position.

11. Release the connectors at locations CN3 and CN9 (Figure 11, #1 and #2) from the left side of the main logic board. Release the gray ribbon connector (Figure 11, #3).

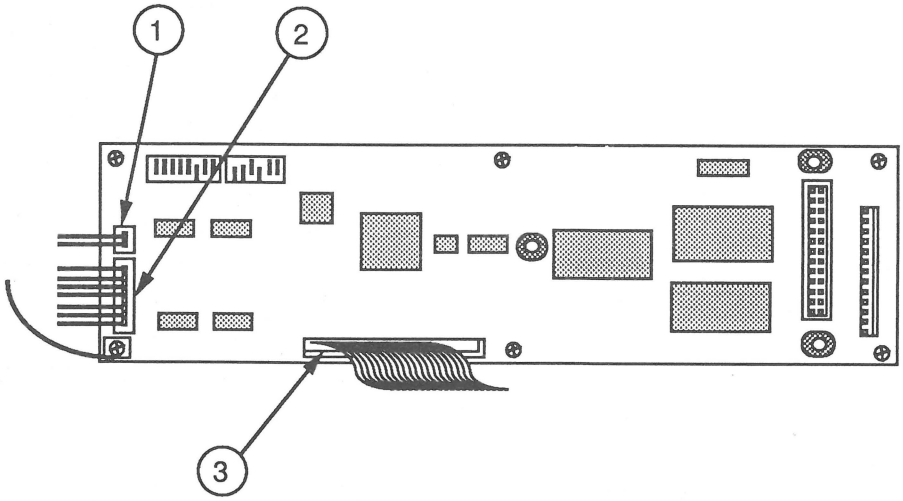


FIGURE 11

12. Remove the old mechanical paper–sensor ground screw (Figure 12, #1) from the left platen bushing plate and discard the screw.

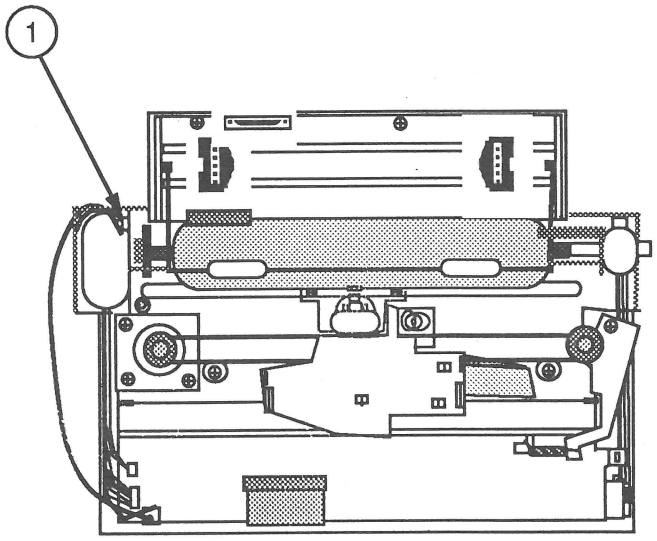


FIGURE 12

13. Remove the two screws (Figure 13, #1) that secure the upper mechanical assembly frame to the printer case.

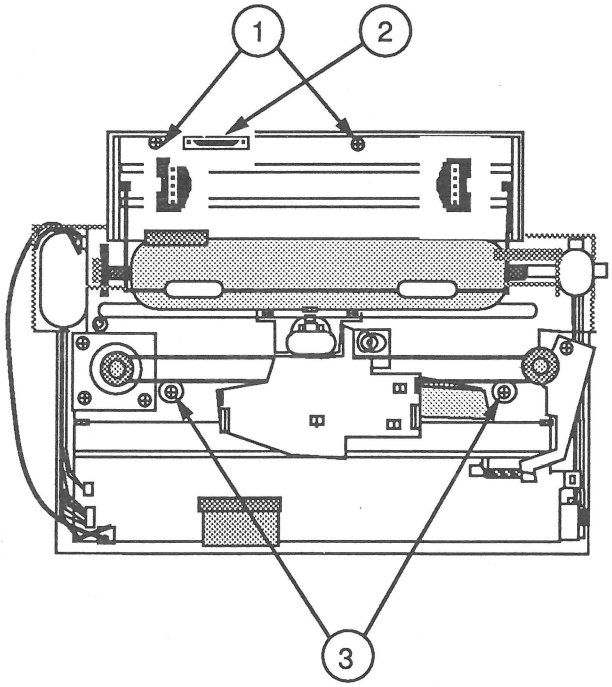


FIGURE 13

14. Remove the sheetfeeder option plug screws and bracket (Figure 13, #2) at the back of the printer. Gently push this connector to the rear of the printer off its mount. This step is important when separating the mechanical assembly from the printer case.

IMPORTANT: *Failure to release the sheet feeder option plug from its mount will prevent the separation of the mechanical assembly and the printer case.*

15. Remove the two shock mount screws (Figure 13, #3) located in the bottom of the printer below the carriage. After removing the screws, move the carriage assembly all the way to the right.

16. Locate the three plastic locking tabs (Figure 14, #1) on the inside of the printer case above the mechanical assembly and below the tractor assembly. Carefully push back on the rear of the printer case, releasing the tabs that help secure the mechanical assembly to the printer case. As you push back on these tabs, gently lift the mechanical assembly by pulling up on the tractor assembly. Make certain the sheetfeeder option plug is pushed off its mount.

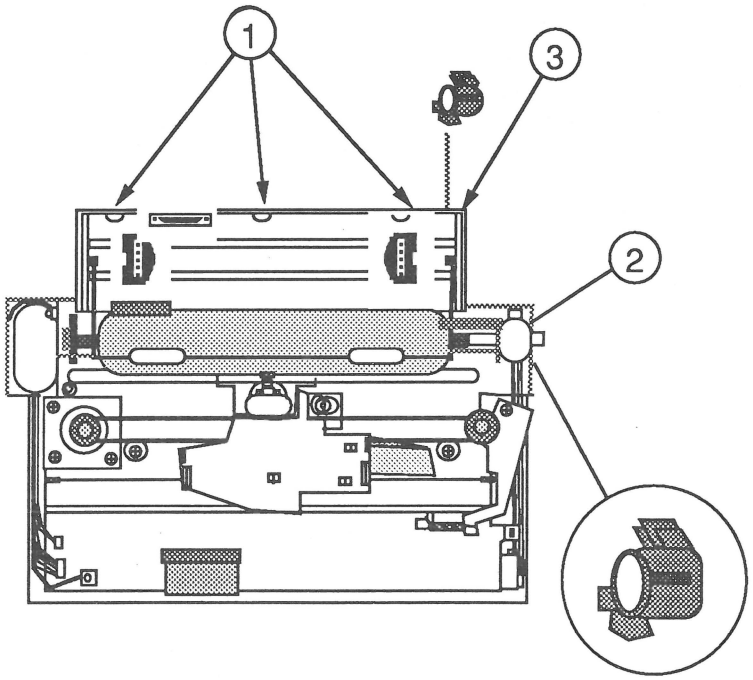


FIGURE 14

17. Pull off the black plastic friction/tractor adjustment piece (Figure 14, #2) from the right side of the platen and place it between the frame and the printer case just above the transformer (Figure 14, #3). This piece will act as a wedge and will support the mechanical assembly at the height necessary to perform the remaining steps of this procedure. The long leg that fits down into the paper friction gears will rest on the back side of the plastic case.

    (This step shortens the amount of time required to take the printer apart and allows you access to all the parts you need to install the optical sensor kit.)

18. Remove the screws holding the left and right platen bushing plates (the silver plates at each end of the platen—see Figure 15, #2 and #3) and remove the bushing plates. (You removed the grounding screw (Figure 15, #4) in a preceding step.)

19. Using the needlenose pliers, remove the paper bail roller arm retention springs (Figure 15, #1) and lift the paper bail all the way up and back.

20. Remove the platen and place it on a smooth flat surface.

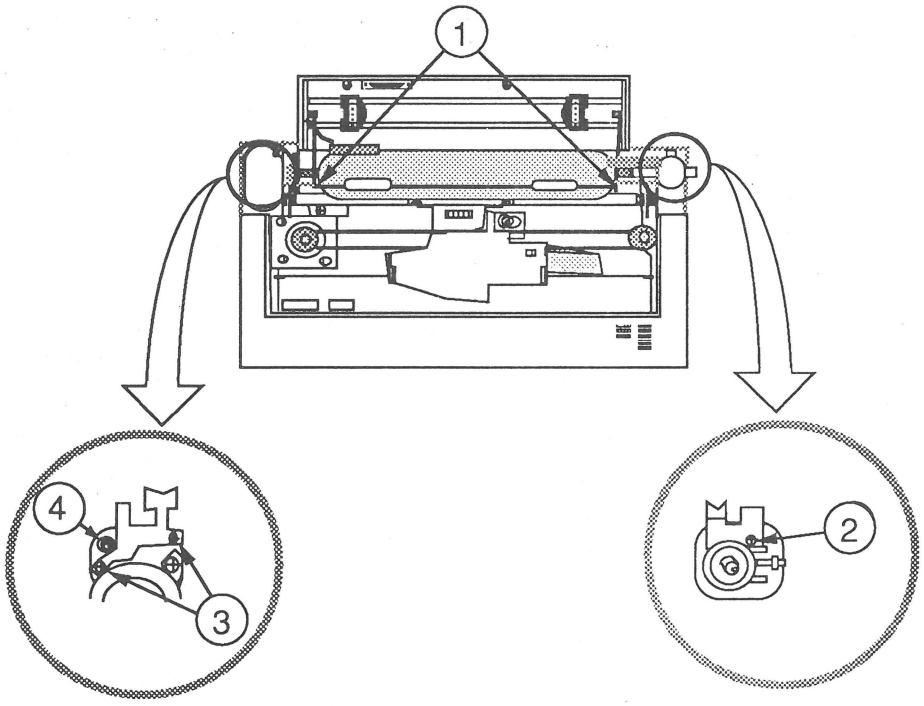


FIGURE 15

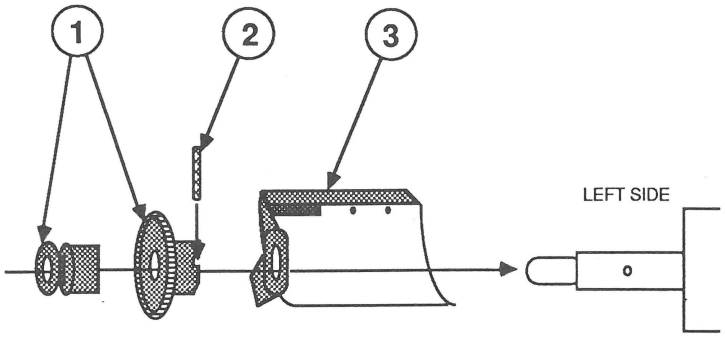


FIGURE 16

21. Remove the bushing and gear (Figure 16, #1) from the left side of the platen. Using a 1/16-inch or 2-mm pin punch, carefully tap the split-sleeve pin (Figure 16, #2) all the way through the platen shaft and pull it out. (This pin will be reused, so do not damage it.)

CAUTION: *To avoid damage to the platen end shaft, do not apply excessive force while removing the pin.*

22. Remove the old mechanical paper-empty sensor frame (Figure 16, #3).

23. Replace the split sleeve pin in the platen shaft (Figure 16, #2) and reinstall the gear and bushing (Figure 16, #1).

24. Remove the three screws (Figure 17, #1) that hold the paper guide in place.

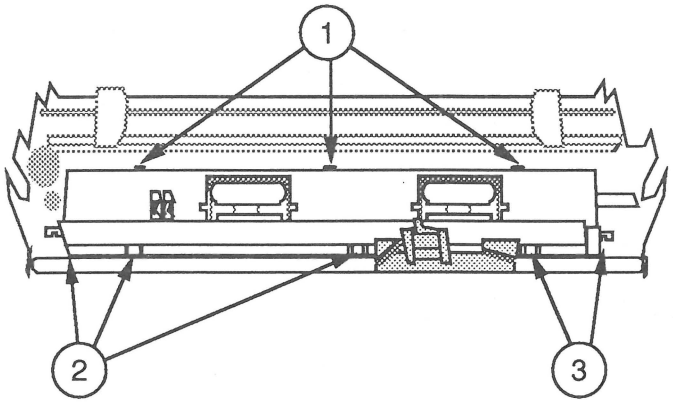


FIGURE 17

25. Push the carrier to the left; then gently unhook each of the three tabs (Figure 17, #2) with a small flatblade screwdriver. Push the carrier to the right; then gently unhook each of the remaining two tabs (Figure 17, #3) with a small flatblade screwdriver.

26. Lift off and remove the two pinch rollers (Figure 18, #1) and metal plates (Figure 18, #2).

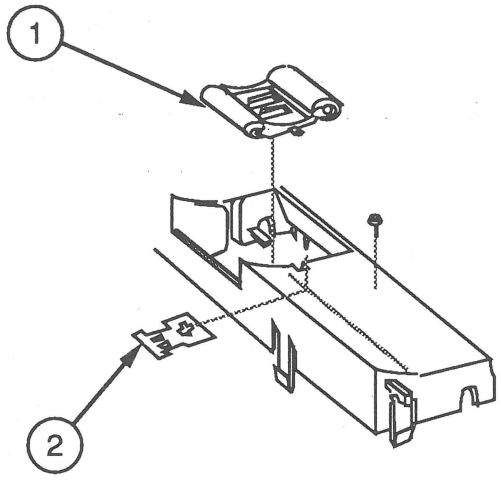


FIGURE 18

Reassembly – Part 1
Optical Assembly

1. Take the new paper guide assembly and optical sensor from the Optical Sensor Kit and hold it as you would if you were placing it in the printer. On the left side of the paper guide assembly there will be an opening for the optical sensor.

2. Turn the paper guide upside down so that the three screw holes are closest to you. Insert the optical sensor (Figure 19, #1) into the opening so that the wires come toward you.

CAUTION: *The sensor wires must be routed correctly; otherwise, they could catch underneath the paper guide assembly on the pinch roller.*

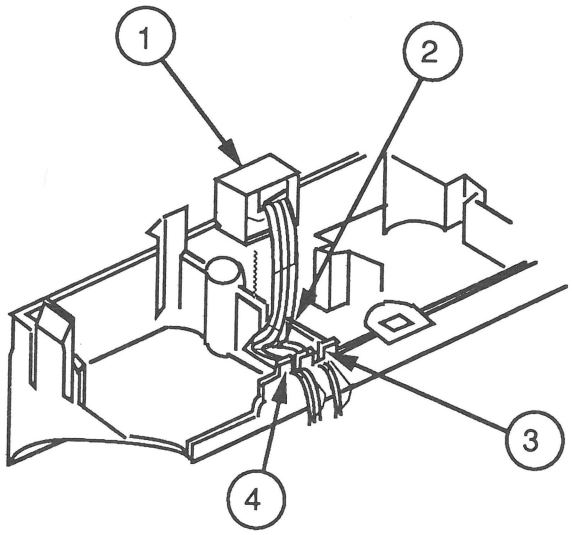


FIGURE 19

3. Hold the wires against the underside of the paper guide and route all of the wires through Slot A (Figure 19, #2) while continuing to press the wires down against the bottom of the paper guide. Direct any two of the wires through Slot B (Figure 19, #3) and the third wire through Slot C (Figure 19, #4).

4. Turn the paper guide assembly over.

5. Replace the pinch rollers (Figure 20, #2) and metal plates (Figure 20, #1) in the openings on the new paper guide. Make sure that the rollers sit flat in the opening.

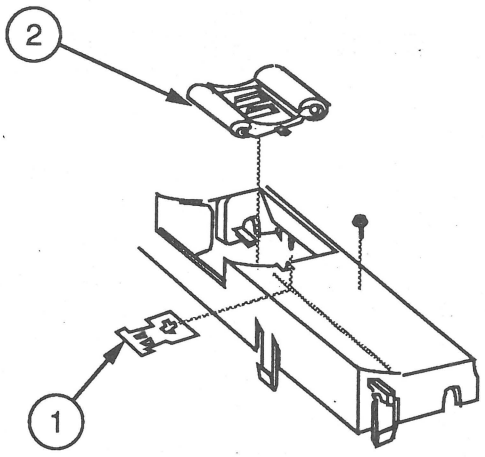


FIGURE 20

6. Pass the three wires beneath the carriage at the opening on the left of the carriage, and then thread them through the rear carriage assembly toward the side of the printer. Route the optical sensor wires along the line feed motor and down the left side of the printer, making sure the wires are seated as far as possible into the groove along the side of the printer case. You can use the silver ground wire to help secure these wires. Make sure that the wires do not end up under the carriage assembly. Bring the connector from these wires to the front of the printer so that it can be plugged into the logic board.

7. The next step is to reseat the paper guide, but before you do that, make sure the left tractor guide is pushed all the way to the left side. Then snap the paper guide into place.

8. Replace the three screws that hold the paper guide assembly in place.

Reassembly – Part 2 Logic Board Modification

Before you connect the sensor to the logic board, you must determine which logic board (old or new) you have. To do this, look at the left side of the logic board and see if you have three connectors CN3, CN9, and CN11. If you do, then you have the new logic board and you can use the procedure below. If you do not have the three connectors, then you have the old logic board and you should skip to the procedure titled "Old Logic Board."

New Logic Board

If you have a new logic board (see Figure 21), pass the optical sensor wires through the groove at the lower left of the carriage and mount their 3-pin plug into the connector at location CN11 (Figure 21, #1) on the main logic board. Connector CN9 (Figure 21, #2) will remain unused. Be sure the jumper switch (Figure 21, #3) at the top middle of the board is on pins 2 and 3.

When this is done, skip the "Old Logic Board" procedure and proceed to the reassembly of the printer.

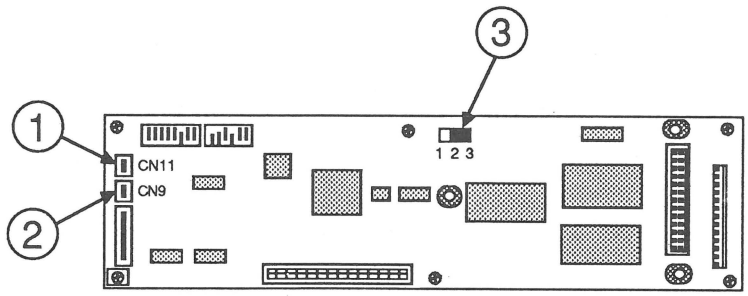


FIGURE 21

Old Logic Board

To modify an old logic board (one that does not have the 3-pin CN11 connector on its left side):

1. Remove the tension spring from above the upper right corner of the logic board and unscrew the six screws holding the board in place. Remove the board.

2. Find the one–inch jumper wire packaged with the daughter board installation bracket in the Optical Sensor Assembly Kit. You must solder this wire to the underside of the main logic board between pin 4 of connector CN3 (Figure 22, #1) and the positive terminal of capacitor C1 (Figure 22, #2).

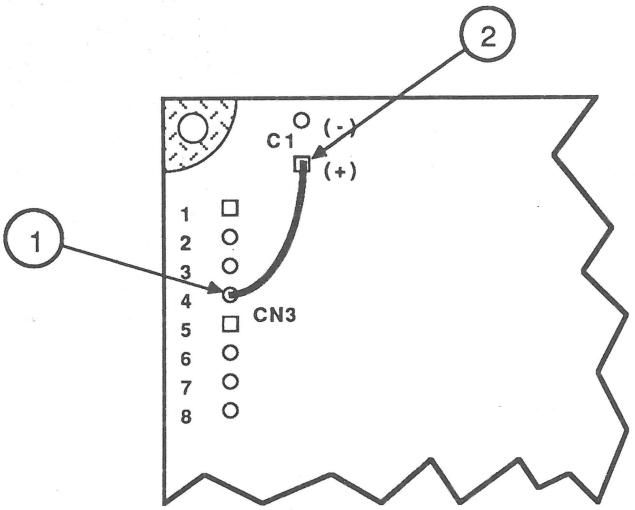


FIGURE 22

The cutaway view of connector CN3 (see Figure 23) displays what could possibly happen to pin number 4 when heat is applied while soldering the jumper wire to the main CPU board. If pin #4 is damaged, straighten the pin before inserting the connector into the socket; otherwise the single wire that is later installed into connector CN3 could be dislodged.

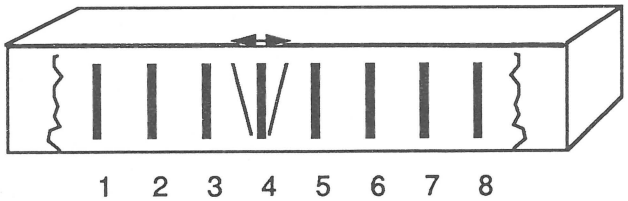


FIGURE 23

3. Before attaching the daughter board and bracket from the kit (Figure 24, #1), plug the yellow wire (Figure 24, #2) from the daughter board into the open slot at position 4 of female connector CN3 (Figure 24, #3). Be sure the connector from this wire enters the slot with its two tiny metal flanges facing away from the board.

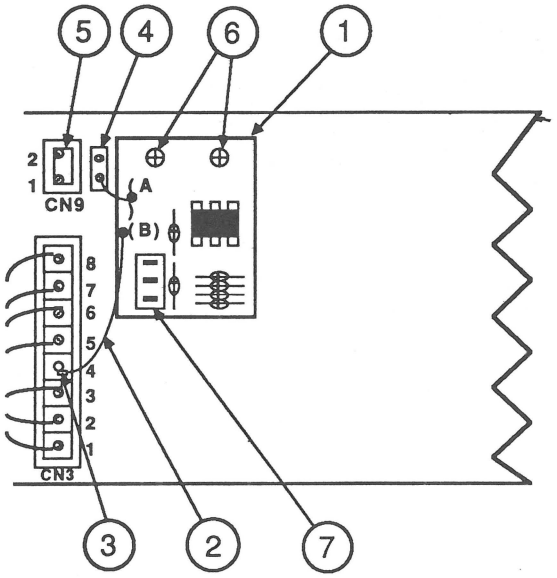


FIGURE 24

4. Install the 2-pin connector (Figure 24, #4) from the daughter board into the main logic board at location CN9 (Figure 24, #5).

5. Screw the bracket onto the main logic board, being careful not to bend or twist the capacitor at C16 on the main logic board.

6. Match the screw holes (Figure 24, #6) on the daughter board with the holes on the installation bracket, and mount the board onto the bracket.

7. Replace the main logic board, its connectors, and the tension spring. Be sure to screw in the ground lead at the lower left corner of the board.

8. Pass the optical sensor wires through the groove at the lower left of the carriage and mount the three-pin connector from the sensor into connector CN1 on the daughter board.

Reassembly – Part 3
Remaining
Printer Parts

1. Replace the platen. Be sure to remount the gears and bushings properly, and remember that the left side of the platen contains the split sleeve pin.

2. Gently push the paper guide against the platen and tighten the two screws.

3. Bring the paper bail assembly back down over the platen and reinstall the springs (Figure 25, #1).

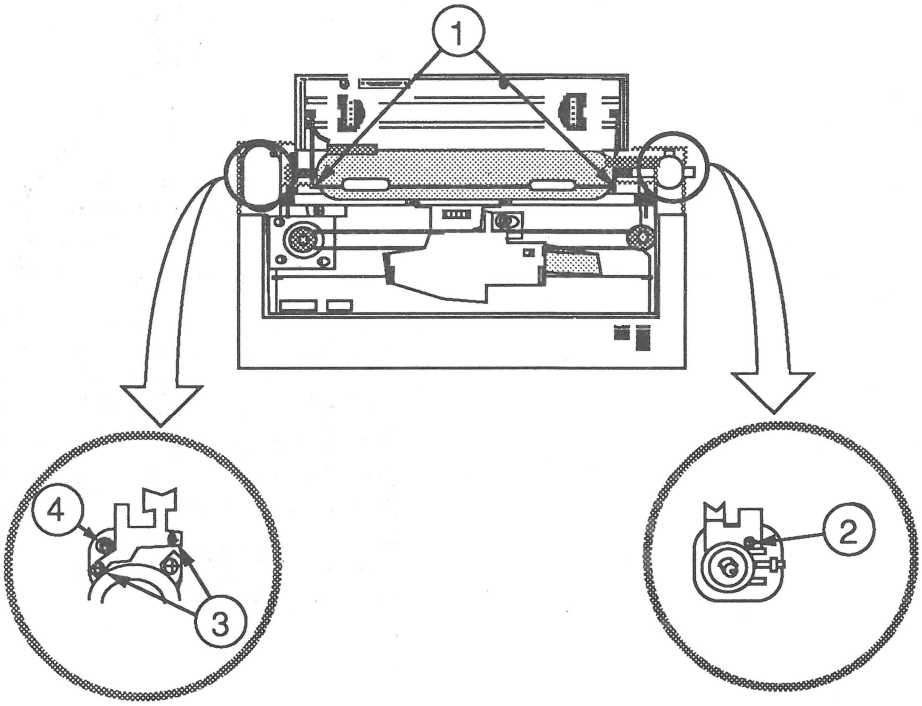


FIGURE 25

4. Replace the left and right platen bushing plates. The left bushing requires two screws (Figure 25, #3) and needs to be held tightly in place against the metal frame while seating the small tab on the very end of the paper bail onto the small groove in the bushing. Also replace the ground wire (Figure 25, #4).

   The right bushing (Figure 25, #2) is somewhat similar but needs only one screw. On the bushing itself is a notch that must sit in a cut-out in the frame. Once these bushings are installed, the tabs on each end of the paper bail, when it is lifted up, should rest on the grooves in the bushings.

5. Remove the black plastic friction adjustment piece (Figure 26, #2) that has been supporting the frame at the right rear of the printer (Figure 26, #3) and put it back on the platen shaft, making sure that the teeth engage the gear properly. Also make sure that the sheet feeder sensor plug is exposed and its wires are securely underneath the frame and not being crushed.

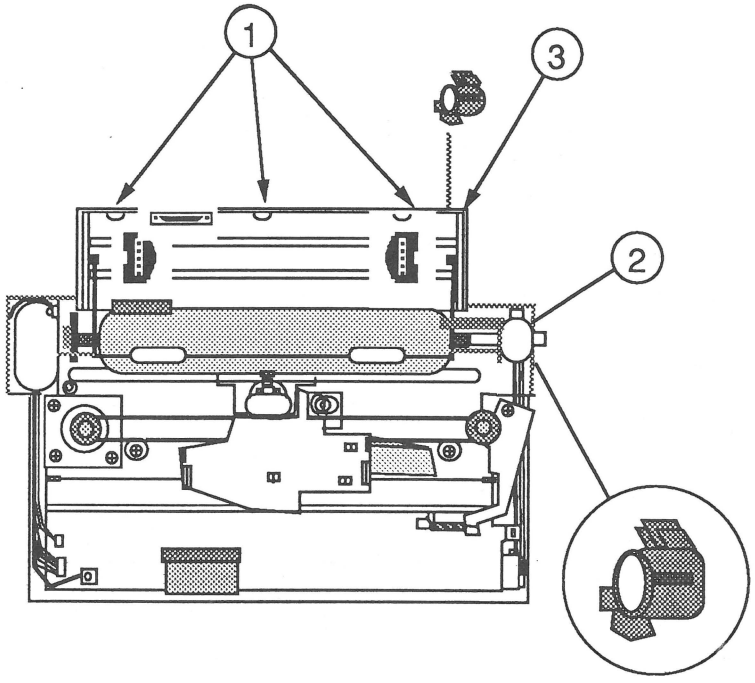


FIGURE 26

6. Reseat the frame in the printer by gently pushing back on the rear of the printer case and lowering the metal frame down under the three tabs of the case (Figure 26, #1). The frame is seated properly when the two white plastic plus-sign-(+)-shaped flanges, next to the shock mount screws (Figure 27, #3) on the bottom are fully exposed and no part of the frame is resting on them.

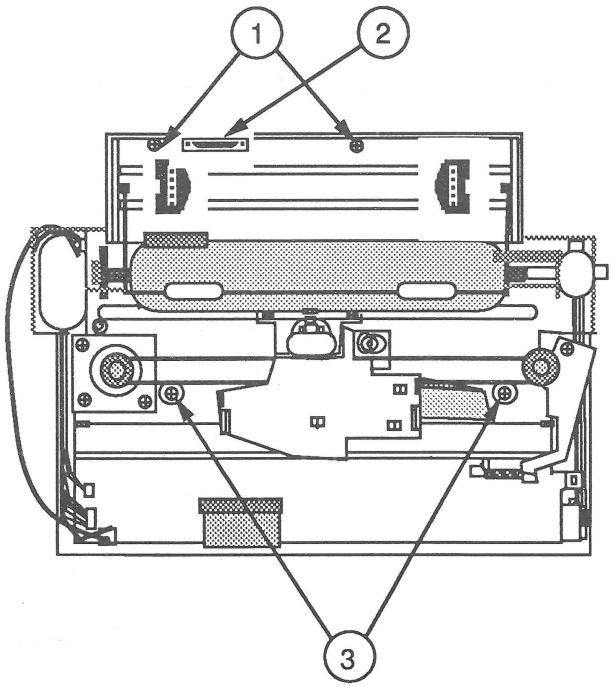


FIGURE 27

7. Replace the two black shock mount screws at the bottom of the frame (Figure 27, #3). (The shorter screw mounts on the right side.)

8. Replace the sheet feeder sensor plug and its connector plate (Figure 27, #2).

9. Replace the two screws (Figure 27, #1) located above the tractor assembly that secure the upper mechanical assembly frame to the printer case.

10. Tip the printer so that it rests on the front part of the case. Reinstall the legs, making sure that the tabs of the power plug are in the grooves on the right leg and that the pin connector is lodged properly on the left. Verify that no wires are exposed. Screw the legs on.

11. Reinstall the paper lever (Figure 28, #2) and knob (Figure 28, #1) on the right leg.

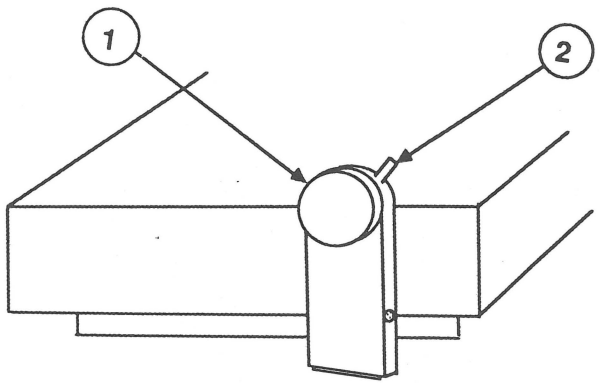


FIGURE 28

12. Carefully reinstall the print head (Figure 29, #1). Verify that the print head is entering its slot smoothly and that none of the metal fingers in the slot are being bent.

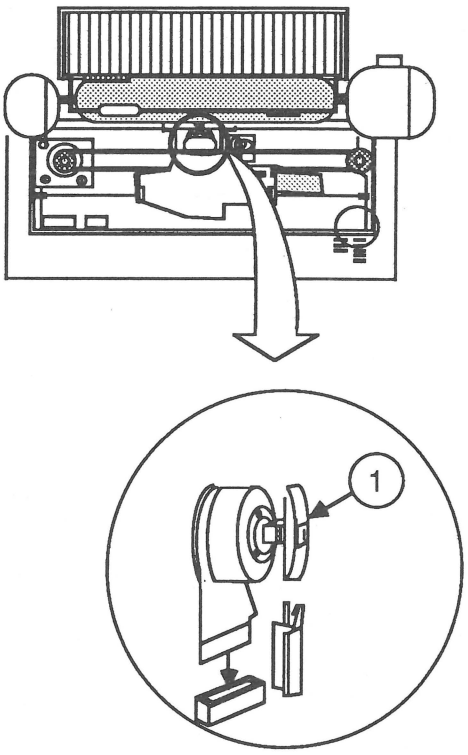


FIGURE 29

13. Slide the carriage assembly all the way to the left. Plug the control panel cable from the top cover into its connector on the logic board, and secure the cover.

14. Replace the paper and tractor covers.

15. Power on the printer and test it thoroughly.

Apple Technical Procedures

ImageWriter II

Section 6 – SheetFeeder

❑ CONTENTS

6.2 Introduction
6.2 Things to Remember
6.3 Testing the SheetFeeder
6.3 Troubleshooting the SheetFeeder
6.4 Materials Required

Take-Apart
6.5 Housing and Paper Tray
6.9 Frame Assembly
6.11 PCB Assembly and Housing Assembly
6.13 Paper Tray Assembly

Note: If a step is underlined, detailed instructions for that step can be found in the Take-Apart section.

❑ INTRODUCTION

The SheetFeeder allows you to use letterhead or other single-sheet paper in an ImageWriter II. For detailed instructions on installation, use, and care, see the *ImageWriter II SheetFeeder Installation Manual.* For more information about a specific part, refer to the SheetFeeder Illustrated Parts at the end of this tab.

Things to Remember

1. Make sure that the SheetFeeder is seated properly and that its edges align properly with ImageWriter II.

2. Put the paper release lever in the friction-feed position.

3. Make sure that the paper is pressed against the feeder rollers. If it is not, the paper will not feed properly.

❑ TROUBLESHOOTING THE SHEETFEEDER

Symptom

The only problem the SheetFeeder can have is partial or no paper feeding. When it has this problem, the error light will be lit on the ImageWriter II.

Procedure

To correct the paper-feeding problem, perform the steps below in the order given. Test the SheetFeeder after each step, and do all testing with a known-good ImageWriter II.

1. Using a cotton swab dipped in alcohol, clean the black-rubber feed rollers mounted on the two roller shafts on the SheetFeeder.
2. Replace the PCB assembly in the SheetFeeder.
3. Replace the frame assembly in the SheetFeeder.

Testing

To test the SheetFeeder:

1. Turn on the ImageWriter II. Make sure the select light is off.
2. Press the form-feed button. A single sheet of paper will load under the print mechanism. The select light should now be on.
3. Power off the printer.
4. Run the ImageWriter II self-test (see Section 1, Basics).

❑ TAKE-APART

Materials Required

Medium Phillips screwdriver
Small Phillips screwdriver
Small flathead screwdriver
Long, thin needlenose pliers
Set of jeweler's screwdrivers

Housing and Paper Tray

To separate the housing and the paper tray:

1. Remove the two plasticized wire paper-support rods (one from the SheetFeeder and one from the paper tray) by pulling the rods straight out of their holes. (For the location of the rods, refer to the SheetFeeder Illustrated Parts List.) Keep the customer's rods to put on the replacement housing and/or paper tray.

2. Unplug the connector (Figure 1, #1).

3. Remove the two screws (Figure 1, #2) that hold the connector plate and mounting springs.

4. Remove the two screws (Figure 1, #3) from the metal clamps that hold the rear housing. Remove the rear housing.

5. Remove the paper guide springs (Figure 1, #4).

6. Remove the paper guide (Figure 1, #5).

7. Remove the two pivot pins. One is on the left and one is on the right side of the SheetFeeder (Figure 1, #6, shows the left side).

8. Use a small flathead screwdriver to gently pry the two pivot shafts out. One is on the left and one is on the right side of the SheetFeeder (Figure 1, #6, shows the left side).

9. Lift the plastic paper tray hinge (Figure 1, #6) away from both sides. Do not attempt to separate the housing from the paper tray until after the next step.

10. Lay the SheetFeeder right-side down. Locate and remove the spring (Figure 1, #7) on the left side of the SheetFeeder.

11. Slide up the paper tray detent plate (Figure 1, #8) to free it from the frame. Gently pry the plate loose.

12. Separate the housing and the paper tray assembly.

To connect the housing and paper tray:

1. Position the paper tray on the housing. Put the paper tray detent plate (Figure 1, #8) into the circular opening in the frame. Slide the plate down into position.

2. Replace the spring (Figure 1, #7) on the left side of the SheetFeeder.

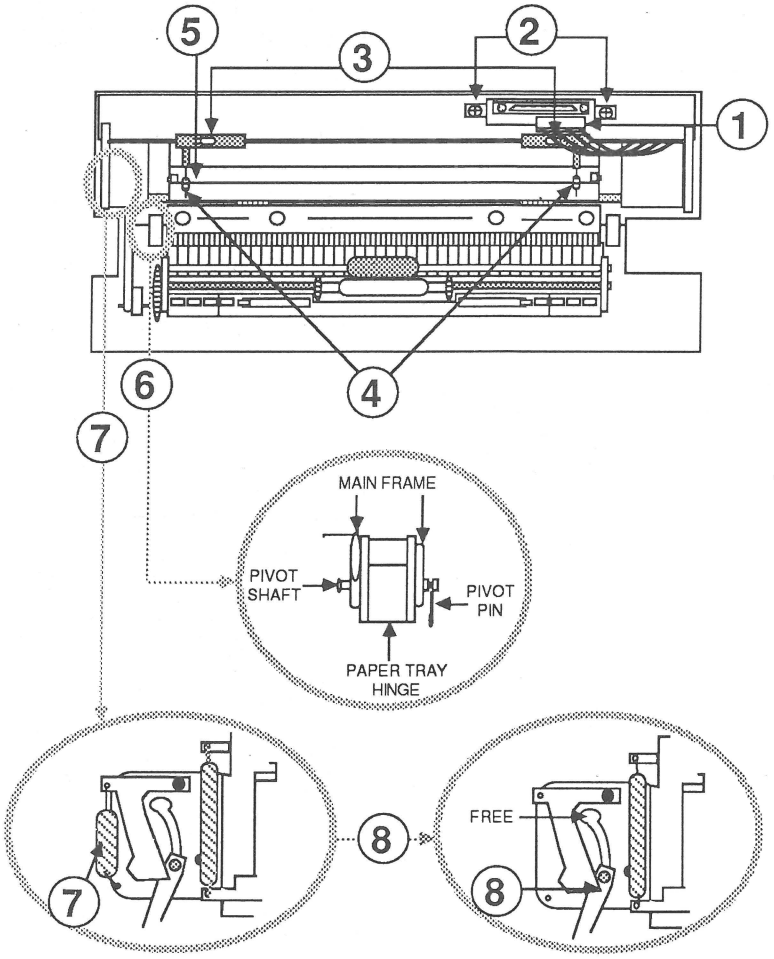


FIGURE 1

3. Line up the plastic hinges on both sides. Slide them into position. (Figure 2, #1 shows the left side.)

4. Use a pair of long, thin needlenose pliers to replace the pivot shaft (Figure 2, #1) on the left side. Slide the pivot pin onto the shaft (Figure 2, #1). Repeat this step for the right side.

5. Replace the paper guide (Figure 2, #2).

6. Replace the paper guide springs (Figure 2, #3).

7. Position the rear housing and the metal clamps (Figure 2, #4), and replace the two screws. Be sure the connector cable is in position.

8. Position the connector plate with the two springs underneath, and replace the two screws (Figure 2, #5).

9. Plug in the connector (Figure 2, #6).

10. Replace the customer's two plasticized wire paper-support rods by sliding them into their holes on the SheetFeeder housing and on the paper tray assembly. (For correct orientation of the rods, refer to the SheetFeeder Illustrated Parts List.)

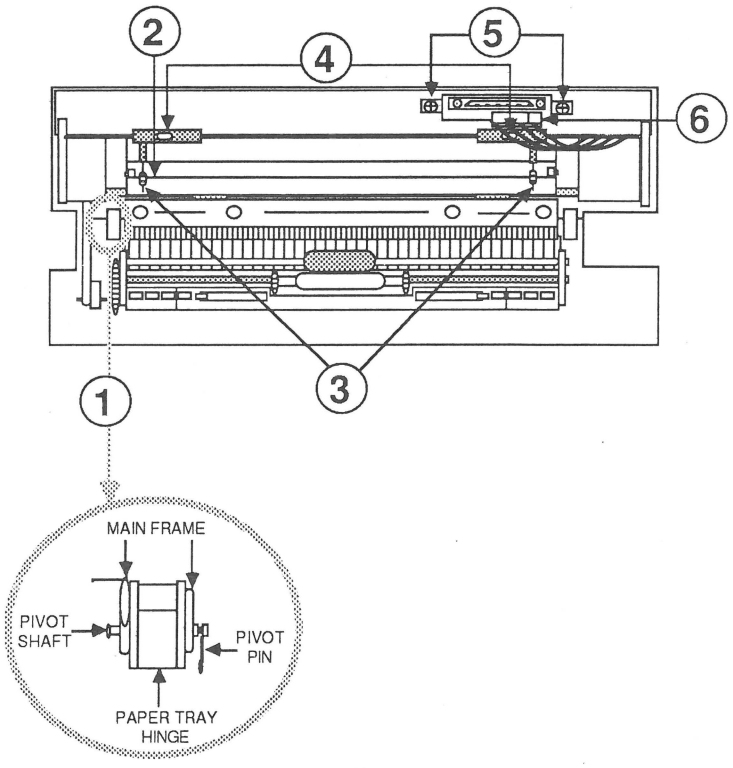


FIGURE 2

Frame Assembly

To remove the frame assembly:

1. Separate the housing assembly and the paper tray assembly.
2. Remove the two screws (Figure 3, #1) that hold the frame assembly together.
3. Remove the grounding screw (Figure 3, #2) attached to the frame assembly.
4. Remove the lever lock (Figure 3, #3) attached to the spring.
5. Remove the connector (Figure 3, #4) that runs from the PCB to the stepper motor.

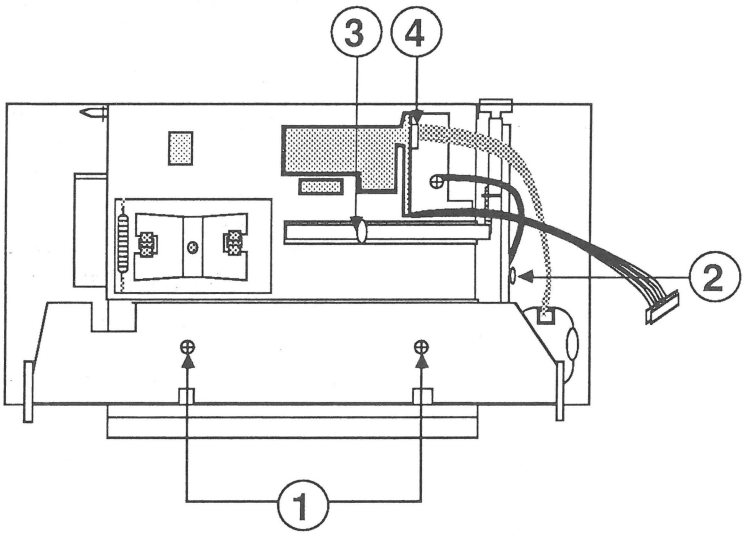


FIGURE 3

6. Remove the paper guide (Figure 4, #5), which is snapped into place.

7. Lift the entire metal frame assembly off of the plastic housing (see shaded area in Figure 4, #5).

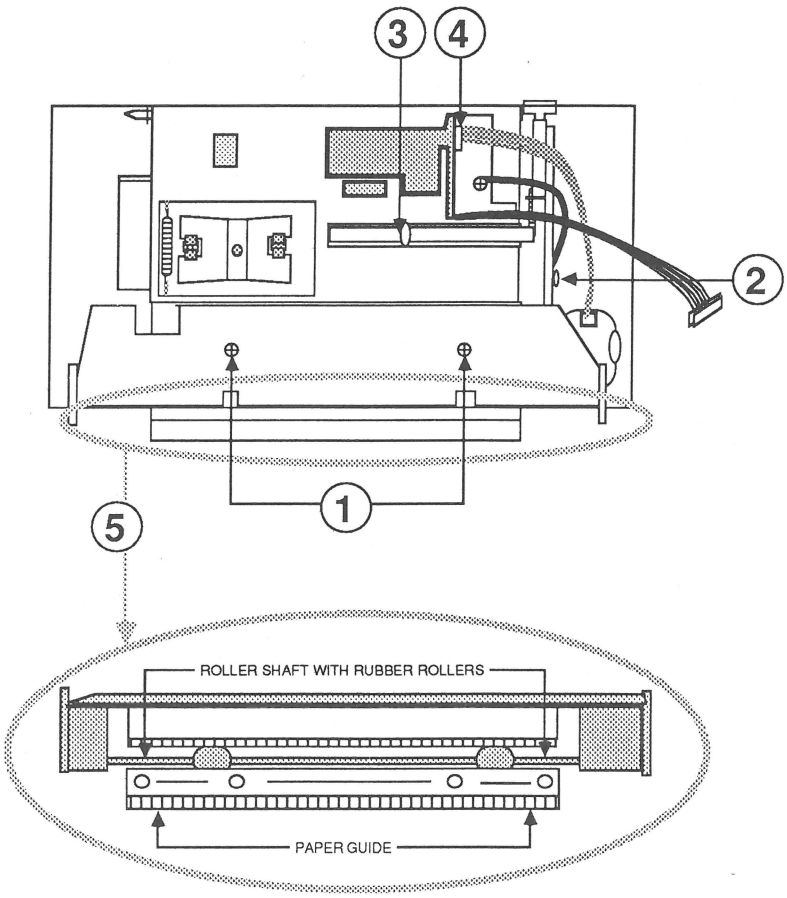


FIGURE 4

To replace the frame assembly:

1. Position the metal frame assembly on the plastic housing. Line up the screw holes, and be sure the paper release button is inserted in the back of the plastic housing. Replace the two screws (Figure 4, #1).

2. Position the paper guide (Figure 4, #5) and snap it into position.

3. Plug in the connector (Figure 4, #4).

4. Replace the lever lock and attach the armed end to the spring (Figure 4, #3).

5. Replace the grounding strap and screw (Figure 4, #2).

6. Reconnect the housing assembly and paper tray assembly.

PCB Assembly and Housing Assembly

To remove the PCB assembly and housing assembly:

1. Separate the paper tray assembly and the housing assembly, and remove the frame assembly.

2. Remove the metal spring plate, which holds the sheet adjuster in place, by squeezing the three tabs (Figure 5, #1) together with a pair of needlenose pliers.

3. Disconnect the spring (Figure 5, #2) that holds the paper stopper in place.

4. Remove the e-ring (Figure 5, #3) from the pointed end of the spring plate shaft.

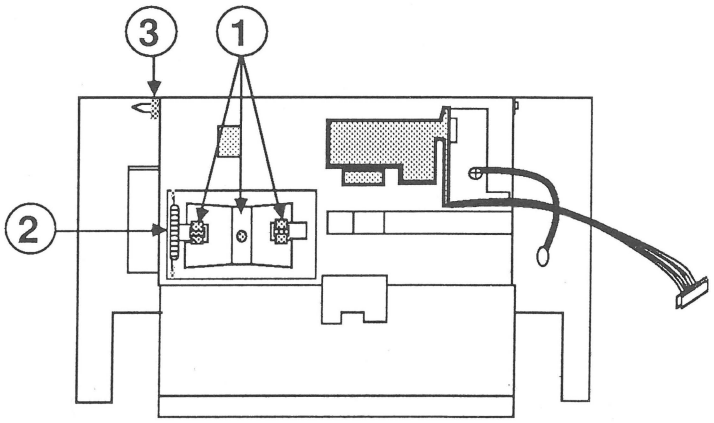


FIGURE 5

5. Set the housing assembly on its side, squeeze the three tabs again (Figure 5, #1), and push them through the openings in the housing. Turn the housing over and remove the plastic spring plate with the attached pieces (Figure 6).

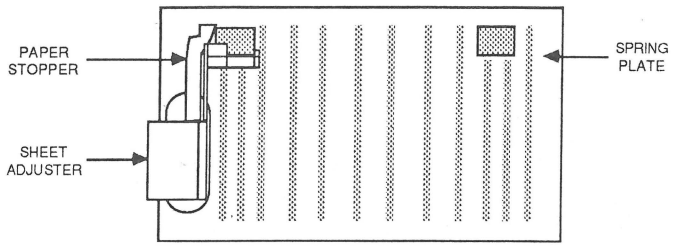


FIGURE 6

6. Note the position of the PCB assembly. Then remove it by gently prying back the two retaining tabs (Figure 7, #1).

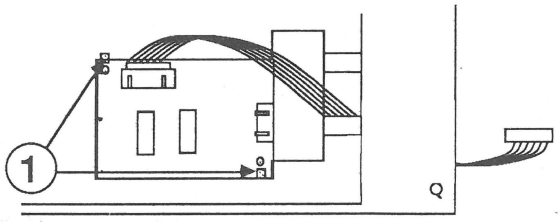


FIGURE 7

To replace the PCB and housing assemblies:

1. Position the PCB assembly and snap it under the two retaining tabs (Figure 7, #1).

2. Position the plastic spring plate and the attached pieces so that the tabs line up (Figure 5, #1). Snap the plate into position and hold it there.

3. Insert the pointed end of the spring plate shaft through the housing, and attach the e-ring (Figure 5, #3).

4. Position the metal spring plate and snap it into place over the tabs (Figure 5, #1).

5. Connect the spring (Figure 5, #2) that holds the paper stopper in place.

6. Replace the frame assembly and connect the paper tray assembly and the housing assembly.

Paper Tray Assembly

The purpose of this procedure is to remove the customer's paper tray assembly and then to remove from it the parts that are not included in the exchange assembly.

IMPORTANT: *Do not discard the parts you remove from the paper tray assembly. They will be needed for the paper tray assembly exchange module.*

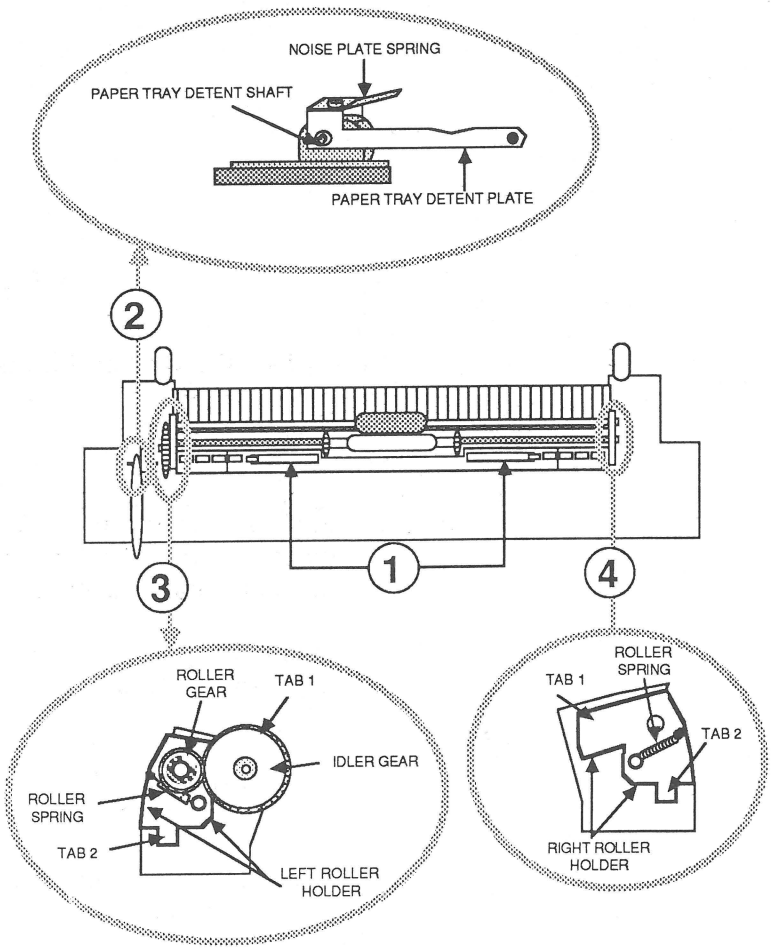


FIGURE 8

To remove the paper tray assembly:

1. Separate the paper tray assembly from the housing assembly.

2. Position the paper tray as shown in Figure 8, the main drawing. Pry off the paper tray locks (Figure 8, #1). Using a small flathead screwdriver, pry off the upper paper tray (the hinges are part of the upper paper tray). The tray snaps onto the tabs. Some of the tabs may break off as you remove it.

3. Locate the paper tray detent plate on the left side (Figure 8, #2). Remove the paper tray detent shaft. Lift the paper tray detent plate off the lower paper tray. Set the parts aside for later use.

4. Gently pull the idler gear, on the left side of the tray, toward you to release tab 1. At the same time, insert a jeweler's screwdriver under tab 2, and slide the left roller holder free of the tabs (Figure 8, #3).

5. Using a jeweler's screwdriver, gently pry loose tab 1 on the right side of the tray. Pry loose tab 2 and lift the right roller holder free (Figure 8, #4).

6. Remove the entire assembly from the lower paper tray.

7. Remove the roller springs (Figure 8, #3 and #4) from both sides of the assembly. The springs hold the roller shaft and the eject shaft in place.

8. For later use, set aside the left and right roller holders, and the one roller shaft still connected to the small gear.

To replace the paper tray assembly:

1. Locate the left and right roller holder and roller shaft. Position the roller shaft with the eject roller so that the black rubber feeder on the customer's roller shaft lines up with the middle section of the eject roller (Figure 9, #1). Place one side in the left roller holder and connect the spring (Figure 9, #2). Repeat this on the right roller holder.

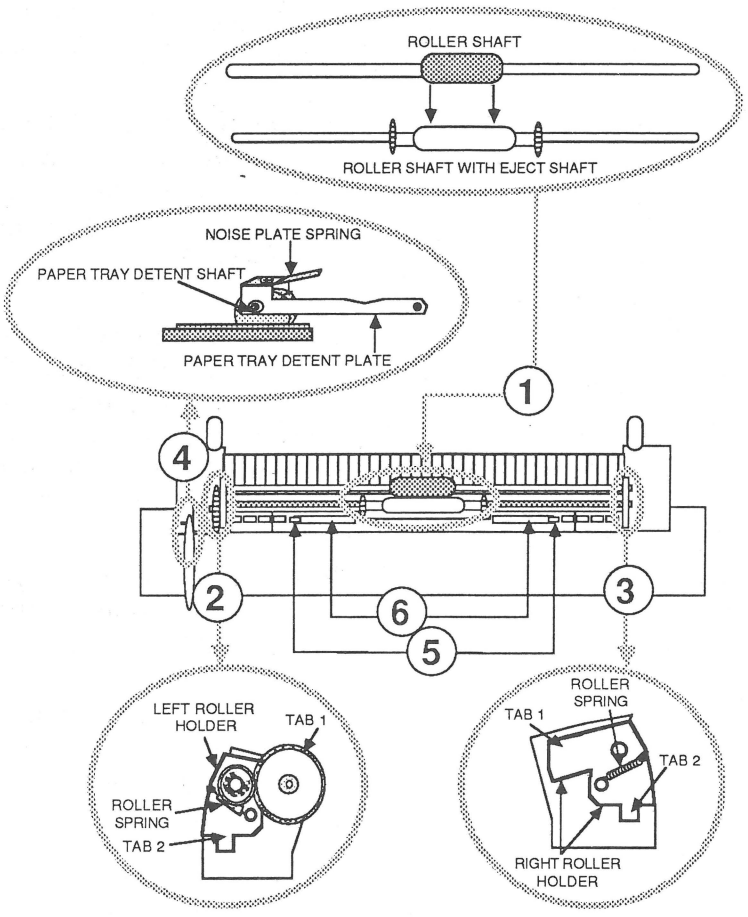


FIGURE 9

2. Position the lower paper tray so it is facing you. Place the roller assembly into position (the white eject shaft should be on the bottom). Snap the roller assembly into position by lining up the four tabs (two on each side) and snap it into position (Figure 9, #2 and #3).

3. Locate the paper tray detent plate. Position the plate on the left side (Figure 9, #4). Insert the paper tray detent shaft.

4. Position the upper paper tray on the lower paper tray. Be sure the two tabs located at the front slide into the lower half (Figure 9, #5). Snap the tray into position.

5. Reconnect the paper tray locks (Figure 9, #6).

6. Connect the paper tray assembly to the housing assembly.

Apple Technical Procedures

ImageWriter II

Illustrated Parts List

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IPL.5 Paper Guide (Figure 2)
IPL.7 Platen and Tractor Assemblies (Figure 3)
IPL.9 Carrier Block (Figure 4)
IPL.11 Carrier (Figure 5)
IPL.13 Covers (Figure 6)
IPL.15 Power Supply and Main CPU PCB (Figure 7)
IPL.17 Cables (Figure 8)
IPL.19 Shift Gear Assembly (Figure 9)
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IPL.35 Operation Panel (Figure 24)
IPL.37 Carrier Motor Kit (Figure 24)
IPL.37 Frame Parts (Figure 25)
IPL.38 Miscellaneous Hardware Kit

The figures and lists in this section include all piece parts that can be purchased separately from Apple for the ImageWriter II, along with their part numbers. These are the only parts available from Apple. Refer to your *Apple Service Programs* manual for prices.

Figures 1-8 (overviews) show the orientation of different assemblies in the ImageWriter II. Figures 9 through 25 (enlarged drawings) supplement the Take-Apart section of these procedures by showing how parts fit together. (Screws and washers shown in these figures are not included in the assemblies.)

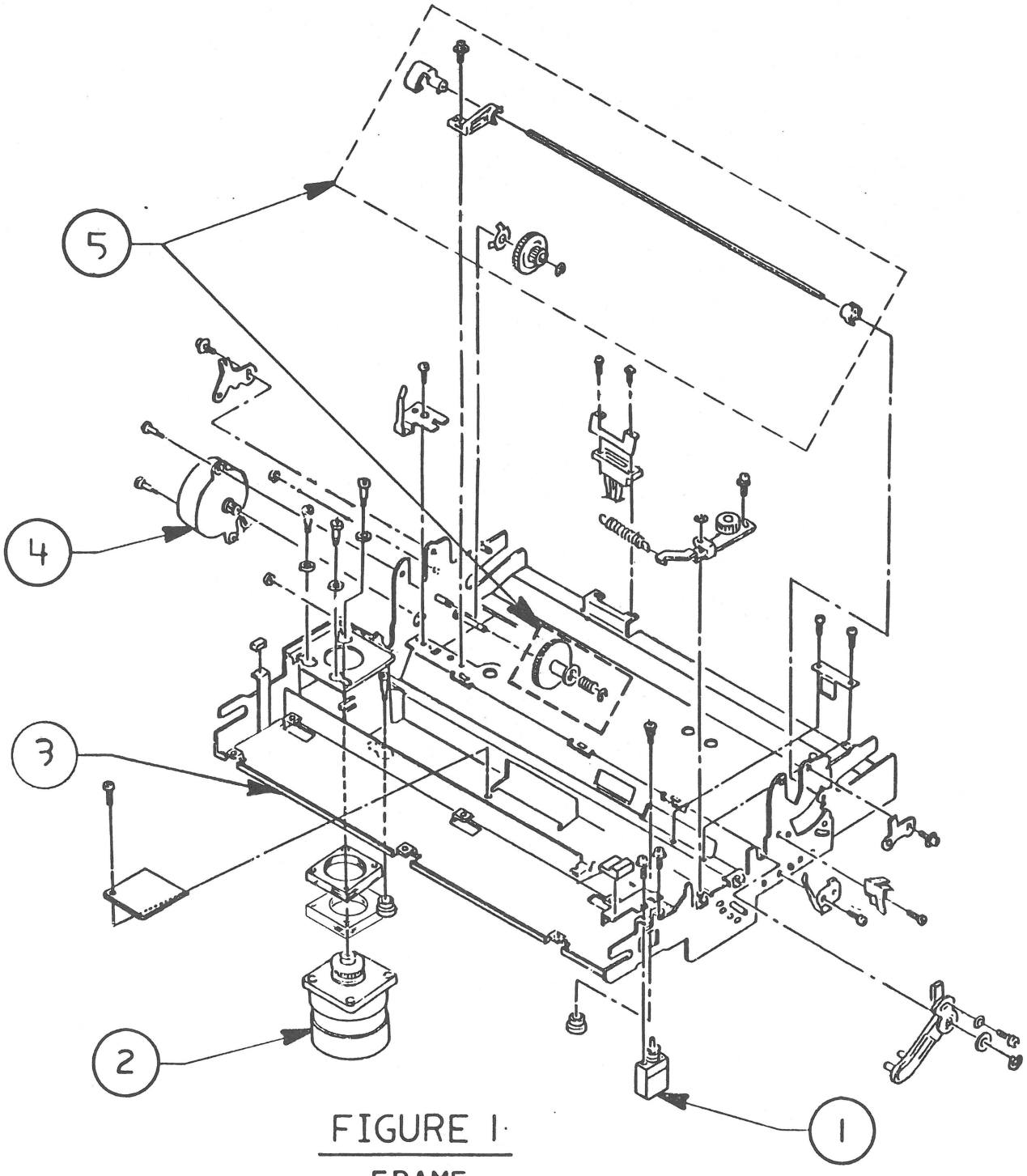


FIGURE 1.

FRAME

❑ KEY TO CODES FOR SCREWS, WASHERS, ETC.

All screws are standardized in ISO. All measurements are in millimeters. Diameter is given first, then length. "SM-3 x 8" means "Sems screw, 3mm diameter by 8 mm length." **Screws and washers are not included with assemblies.**

C	=	C-ring	SM	=	sems screw
D	=	dish head screw	SMW	=	double sems screw
E	=	E-ring	SP	=	spring pin
F	=	flat head screw	SW	=	spring washer
FL	=	flanged screw	T	=	tapping screw
H	=	hexagon bolt	TW	=	toothed washer
N	=	hexagon nut	U	=	U-ring
P	=	pan head screw	W	=	washer
S	=	set screw			

❑ FRAME (Figure 1)

Item	Part No.	Description
1	937-0001	Power Switch
2	959-0004	Carrier Motor
3	948-0038	Frame
4	959-0005	Paper Feed Motor
5	076-0150	Shift Gear Assembly (See Figure 9.)

Note: Some of the other parts shown in this diagram are available as "Frame Parts." Refer to Figure 25 for further information.

The following screws, e-clips, etc., are used in the parts shown in Figure 1:

E-3	SMW-2.6 x 6
E-4	SMW-3 x 6
SM-2.6 x 6	SMW-3 x 8
SM-3 x 6	SMW-4 x 6
SM-3 x 8	W-3.3

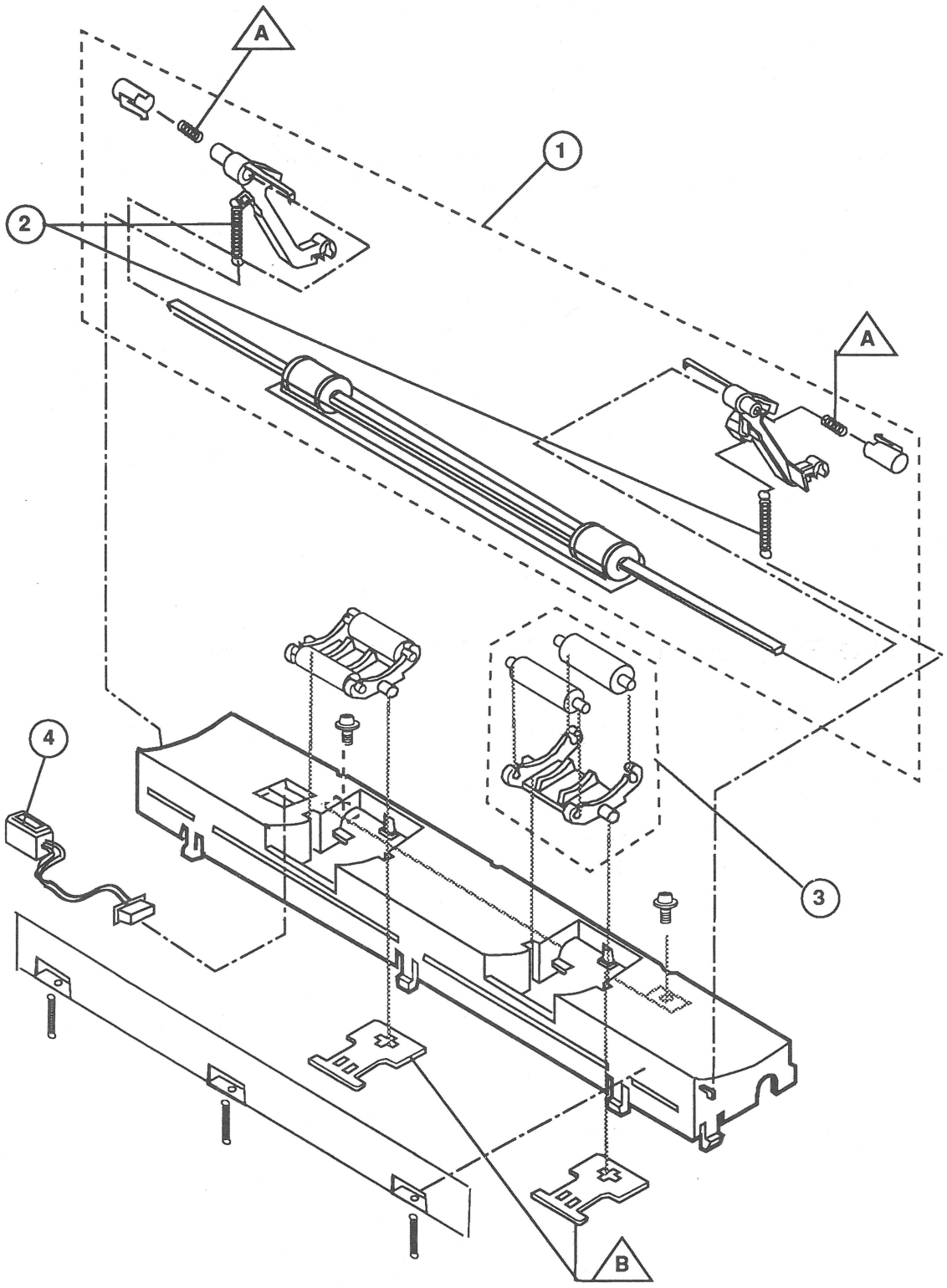


Figure 2

❑ PAPER GUIDE (Figure 2)

Item	Part No.	Description
1	076-0154	Paper Bail Assembly (See Figure 10)
2	957-0041	Spring, Bail Roller Arm (5/pk)
3	076-0155	Pinch Roller Assembly (See Figure 11)
4	925-0008	Optical Paper-Out Sensor (See Figure 12)

Note: Some of the other parts shown in this diagram are available as part of the Miscellaneous Hardware Kit. Refer to Miscellaneous Hardware Kit for further information. These parts are not available separately.

A	Spring, Bail Roller Shaft (3/pk)
B	Plate, Pinch Roller Spring (3/pk)

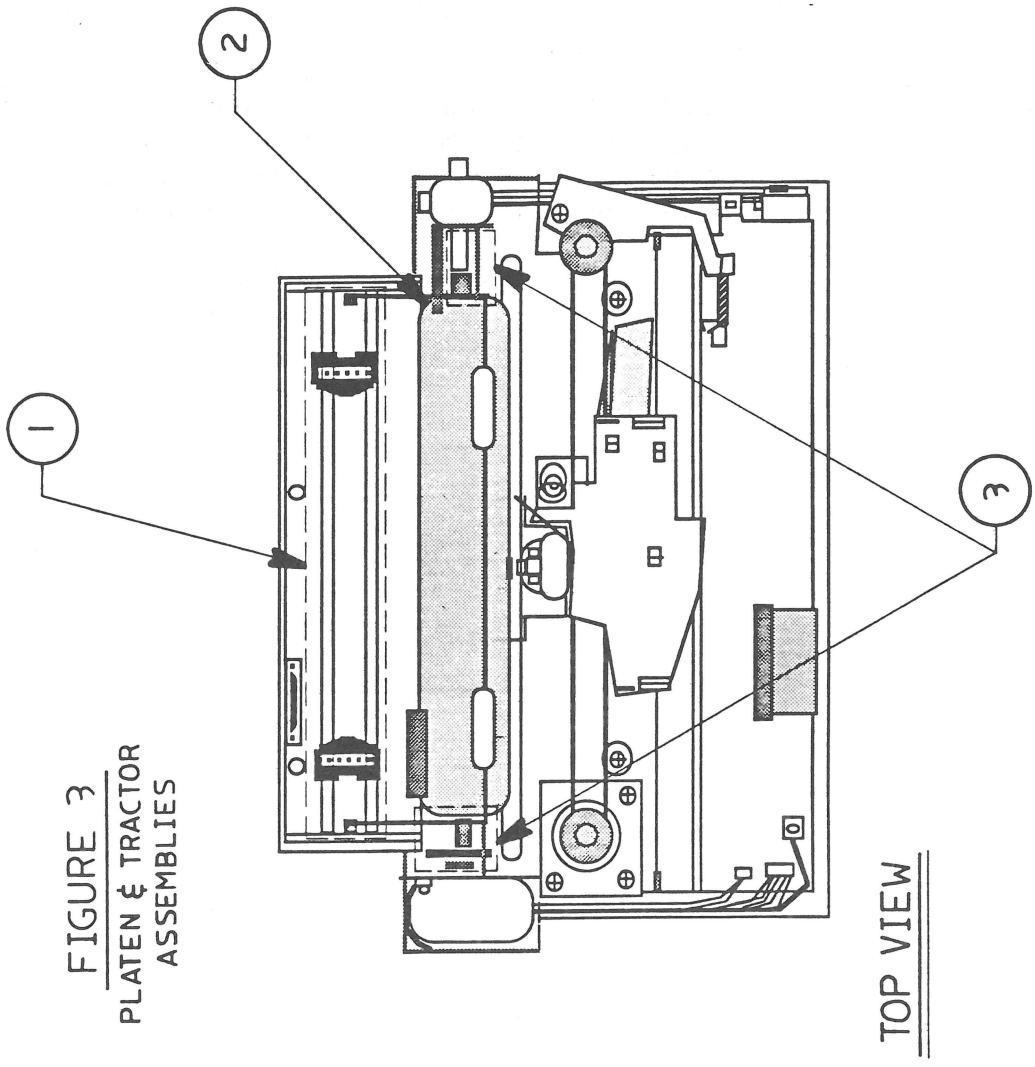


FIGURE 3
PLATEN & TRACTOR ASSEMBLIES

❑ PLATEN & TRACTOR ASSEMBLIES, TOP VIEW (Figure 3)

Item	Part No.	Description
1	076-0152	Tractor Assembly (See Figure 13.)
2	949-0006	Platen
3	076-0153	Platen Assembly Parts without Platen (See Figure 14.)

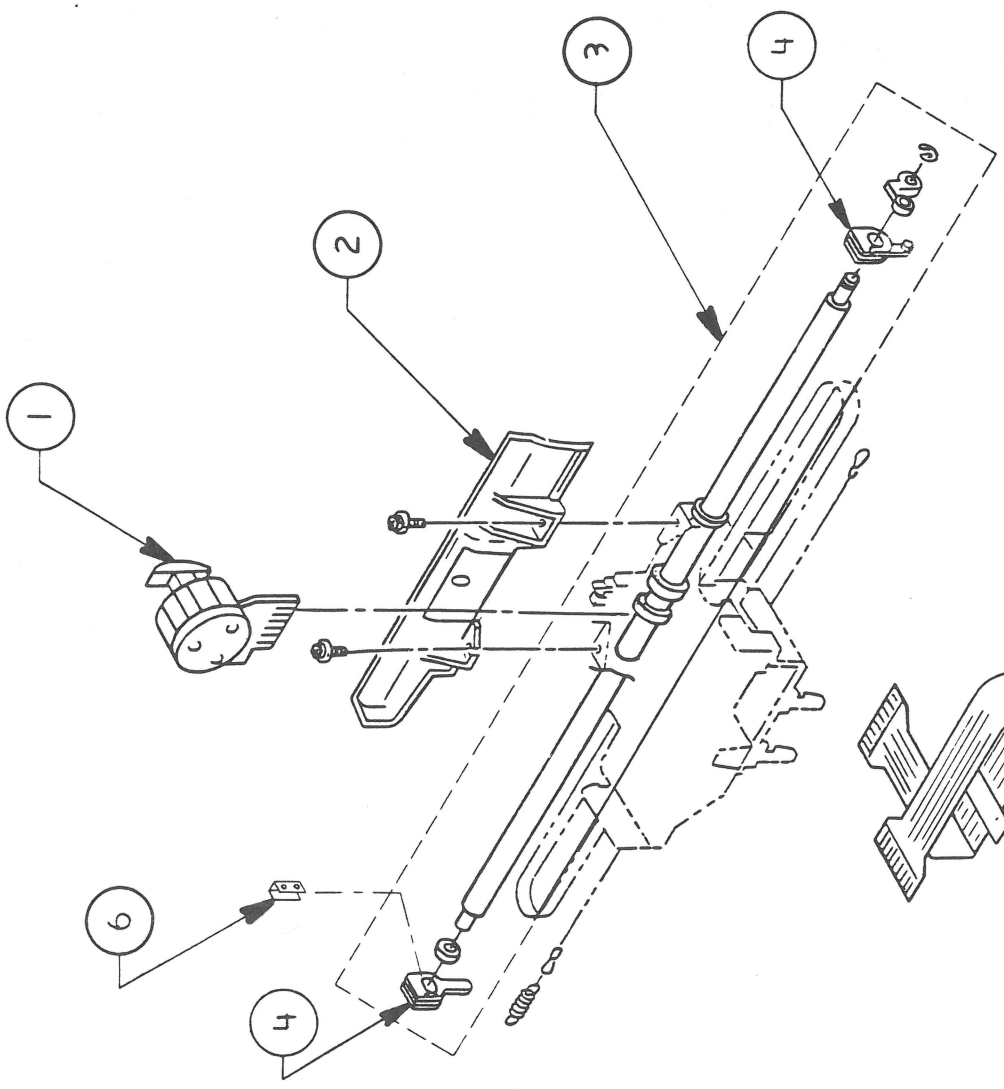


FIGURE 4
CARRIER BLOCK

❑ CARRIER BLOCK (Figure 4)

Item	Part No.	Description
1	661-0316	Print Head
2	949-0029	Paper Guide
3	076-0157	Carrier Block Assembly (See Figure 15.)
4	958-0006	Carrier Shaft Bushing
5	936-0006	Flexible Cable
6	955-0005	Shims, ImageWriter II

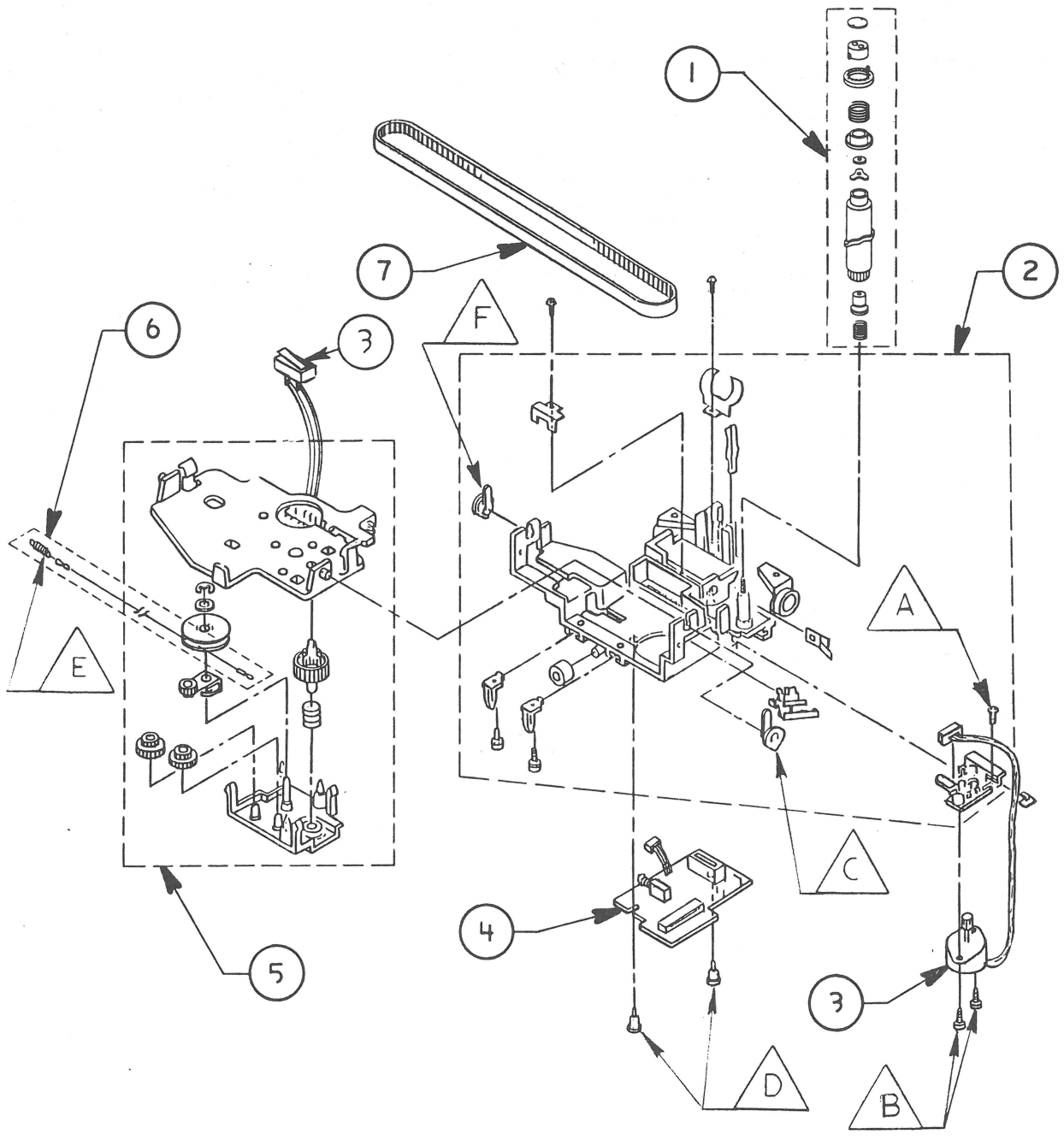


FIGURE 5

❑ CARRIER (Figure 5)

Item	Part No.	Description
1	076-0158	Color Ribbon Assembly (See Figure 16.)
2	076-0160	Carrier Parts (See Figure 17.)
3	959-0003	Motor Assembly, Ribbon
4	962-0001	Print Head PCB
5	076-0159	Ribbon Frame Assembly (See Figure 18.)
6	935-0001	Ribbon Wire and Spring (See Figure 19.)
7	959-0002	Carrier Belt

The following screws, e-clips, etc., are used in the parts shown in Figure 5:

E-3	P-2.6 x 8
E-4	SM-3 x 10
P-2.6 x 6	SM-2.6 x 5
T-2.6 x 5	W-5.5

Note: Some of the other parts shown in this diagram are available as part of the Miscellaneous Hardware Kit. Refer to Miscellaneous Hardware Kit for further information. These parts are not available separately.

A	Screw, Pan Head, 2.6 x 8 (3/pk)
B	Screw, Tapping, 2.6 x 5 (3/pk)
C	Bushing, Ribbon Frame, Right (3/pk)
D	Screw, Head PCB (3/pk)
E	Spring, Ribbon Wire (3/pk)
F	Bushing, Ribbon Frame, Left (3/pk)

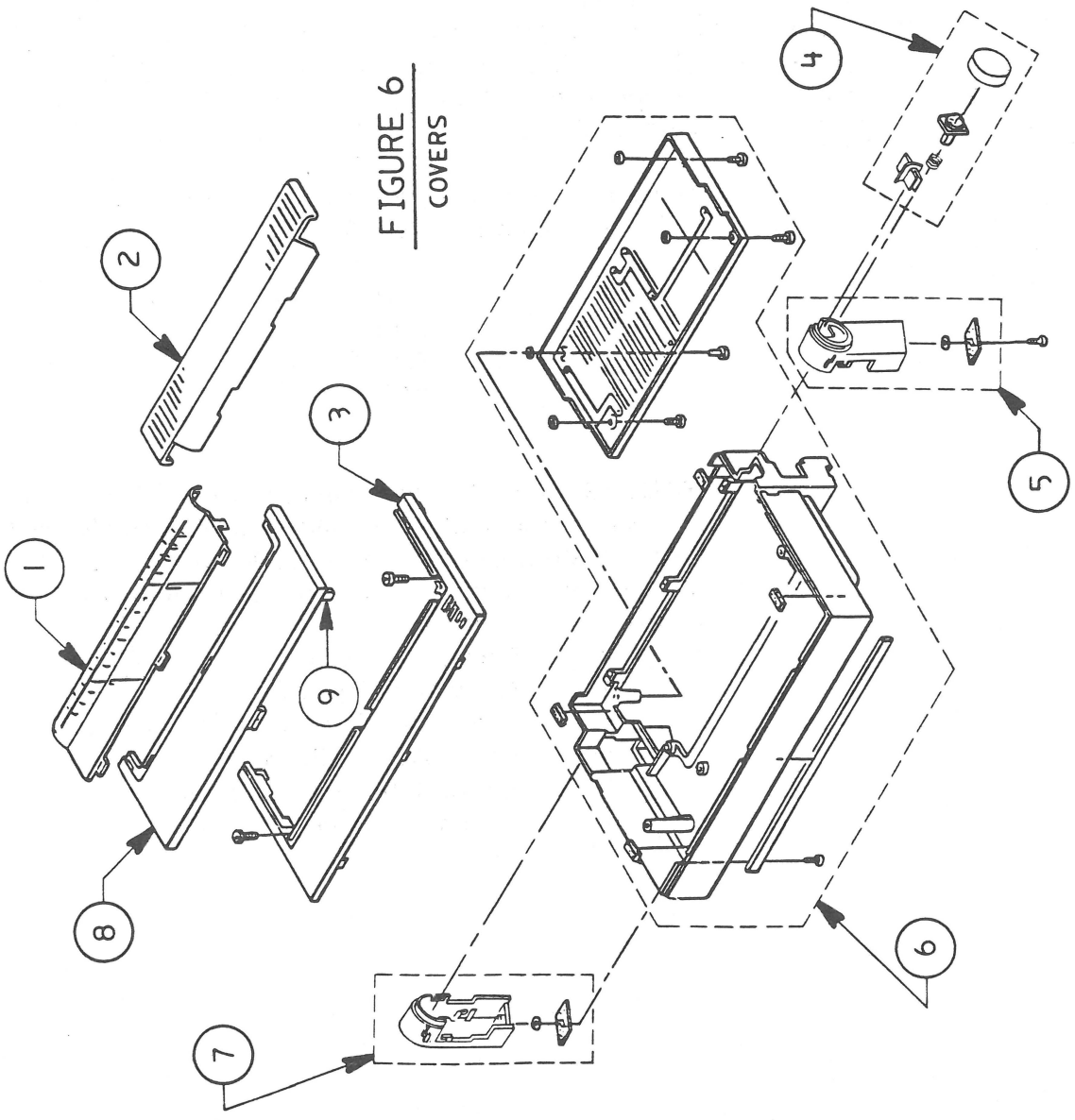


FIGURE 6
COVERS
1
2
3
4
5
6
7
8
9

❑ COVERS (Figure 6)

Item	Part No.	Description
1	949-0008	Paper Cover
2	949-0010	Tractor Cover, White
	949-0085	Tractor Cover, Platinum
3	949-0011	Top Cover, White
	949-0086	Top Cover, Platinum
4	076-0164	Platen Assembly Knob, White
	076-0239	Platen Assembly Knob, Platinum (See Figure 20.)
5	076-0163	Support Leg Assembly (Right), White
	076-0238	Support Leg Assembly (Right), Platinum (See Figure 21.)
6	076-0161	Bottom Assembly Cover, White
	076-0236	Bottom Assembly Cover, Platinum (See Figure 22.)
7	076-0162	Support Leg Assembly (Left), White
	076-0237	Support Leg Assembly (Left), Platinum (See Figure 23.)
8	949-0009	Ribbon Cover, White
	949-0084	Ribbon Cover, Platinum
9	952-0012	Case Top Magnet

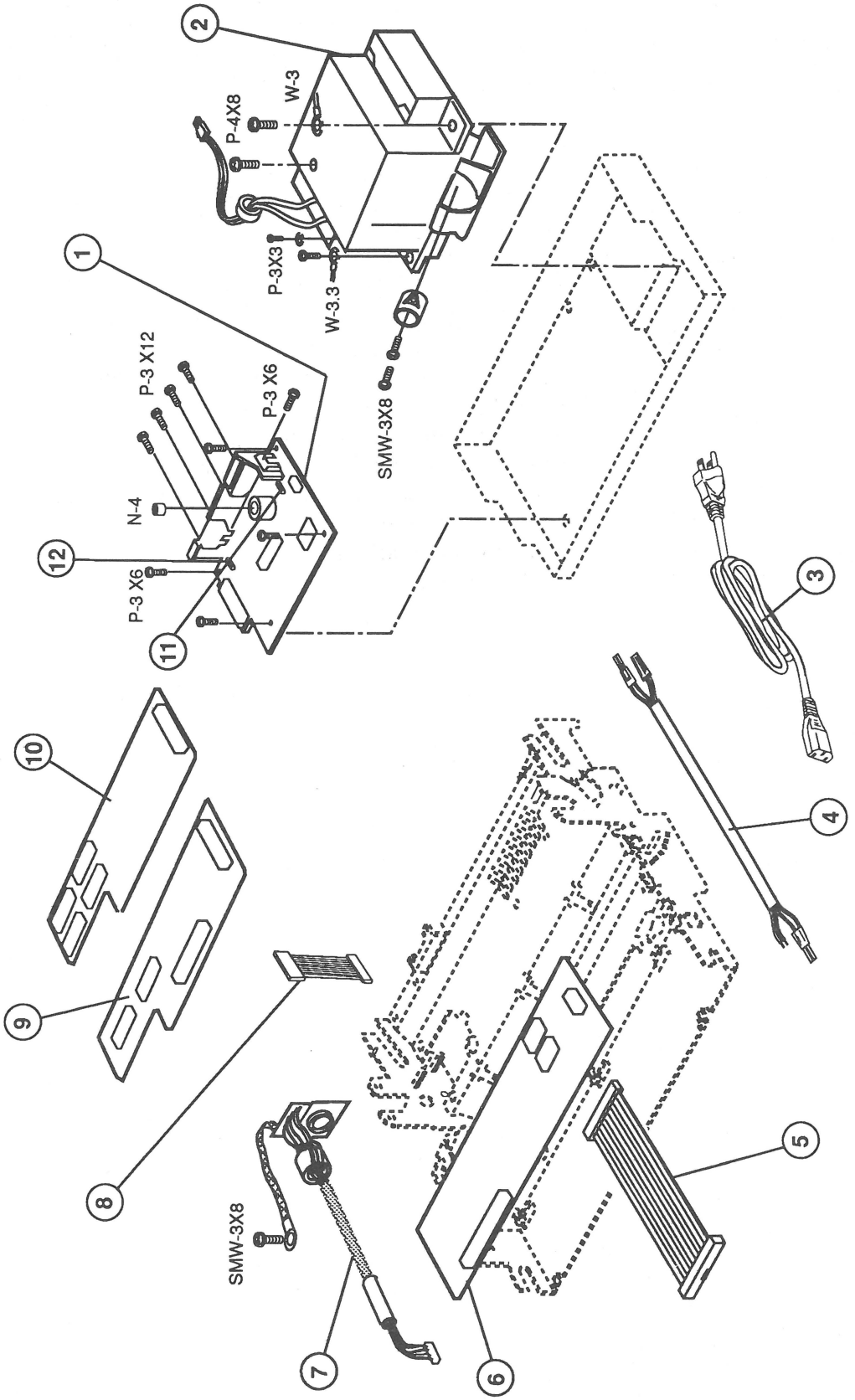

2
W-3
P-4X8
P-3X3
W-3.3
SMW-3X8
1
P-3 X12
P-3 X6
N-4
12
P-3 X6
11
3
10
4
9
8
SMW-3X8
7
6
5

Figure 7

❑ POWER SUPPLY & MAIN CPU PCB (Figure 7)

Item	Part No.	Description
1	661-0303	ImageWriter II Drive PCB
2	915-0001	Transformer, 120V
	915-0029	Switch/Transformer Assembly 100-240V
3	936-0001	Power Cord, 110V
4	936-0009	Cable, Noise Filter
5	936-0007	Cable, PCB Interconnection
6	661-0304	ImageWriter II Main CPU PCB
	661-0413	ImageWriter II Main CPU PCB, Rev A
7	936-0003	Cable, Interface
8	936-0008	Cable, Operation Panel
9	661-0319	ImageWriter II 32K Option Card
10	661-0325	ImageWriter II AppleTalk Option Card
11	740-0022	Fuse, 5A
12	941-0002	Fuse, 1A

Note: The following screws, e-clips, etc., are used in the parts shown in Figure 7:

N-4
P-3 x 3
P-3 x 6
P-3 x 12
P-4 x 30
SMW-3 x 6
SMW-3 x 8
SMW-4 x 8
W-3.3
P-4 x 8

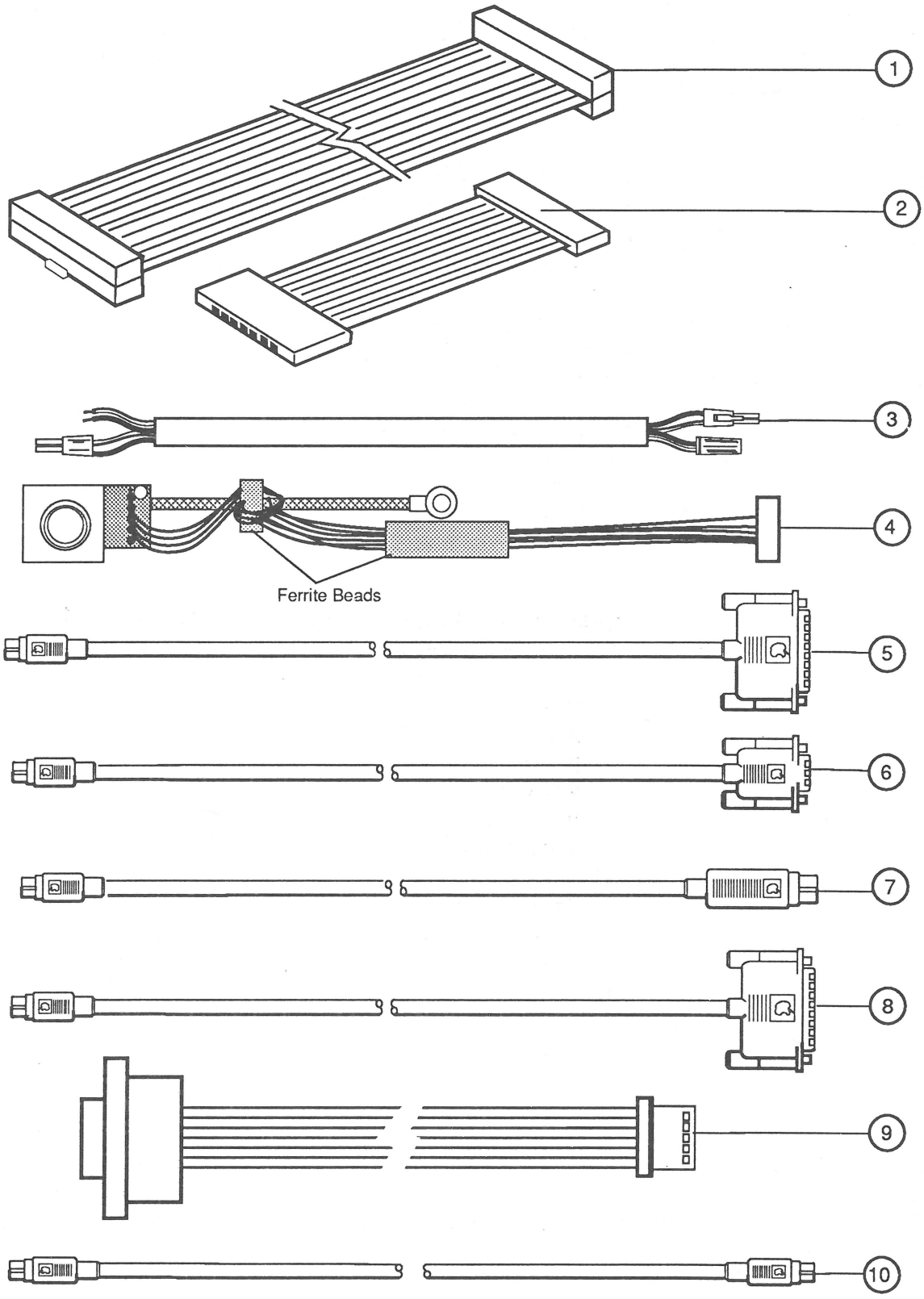


Figure 8

❑ CABLES (Figure 8)

Item	Part No.	Description
1	936-0007	Cable, PCB Interconnection
2	936-0008	Cable, Operation Panel
3	936-0009	Cable, Noise Filter
4	936-0003	Cable, Interface
5	590-0555	Cable, APM/ImageWriter II to Apple III Plus, Apple III, Macintosh XL, Smoke
6	590-0551	Cable, APM/ImageWriter II to Macintosh, Smoke
7	590-0554	Cable, ImageWriter II to Apple IIc, Smoke
8	590-0556	Cable, ImageWriter II to Apple II, II Plus, IIe, Smoke
9	936-0034	Cable, SheetFeeder, ImageWriter II
10	590-0552	Cable, APM/ImageWriter II to Apple IIGS, Macintosh Plus, Smoke

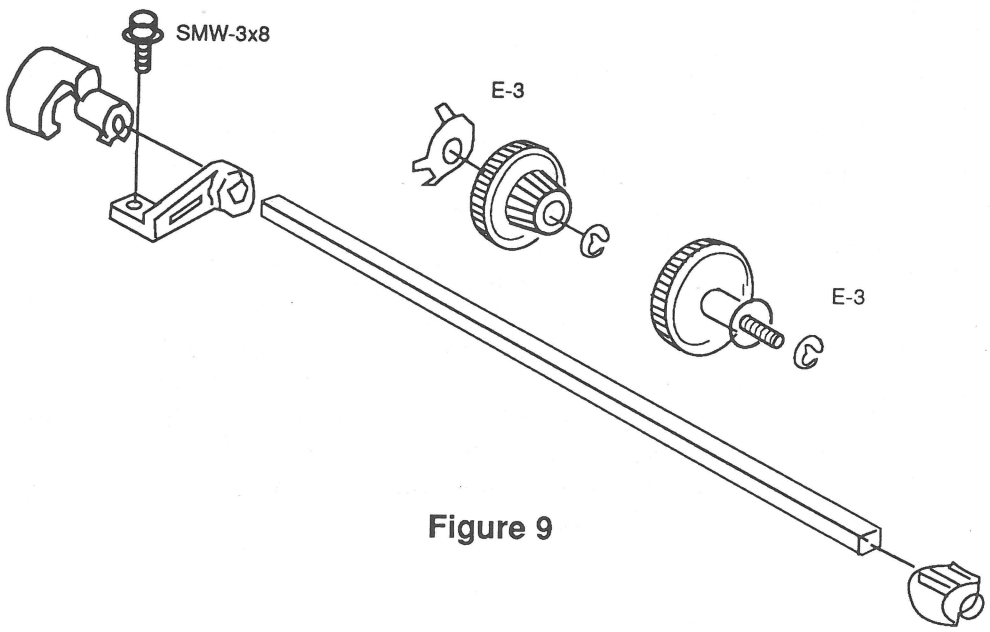


Figure 9

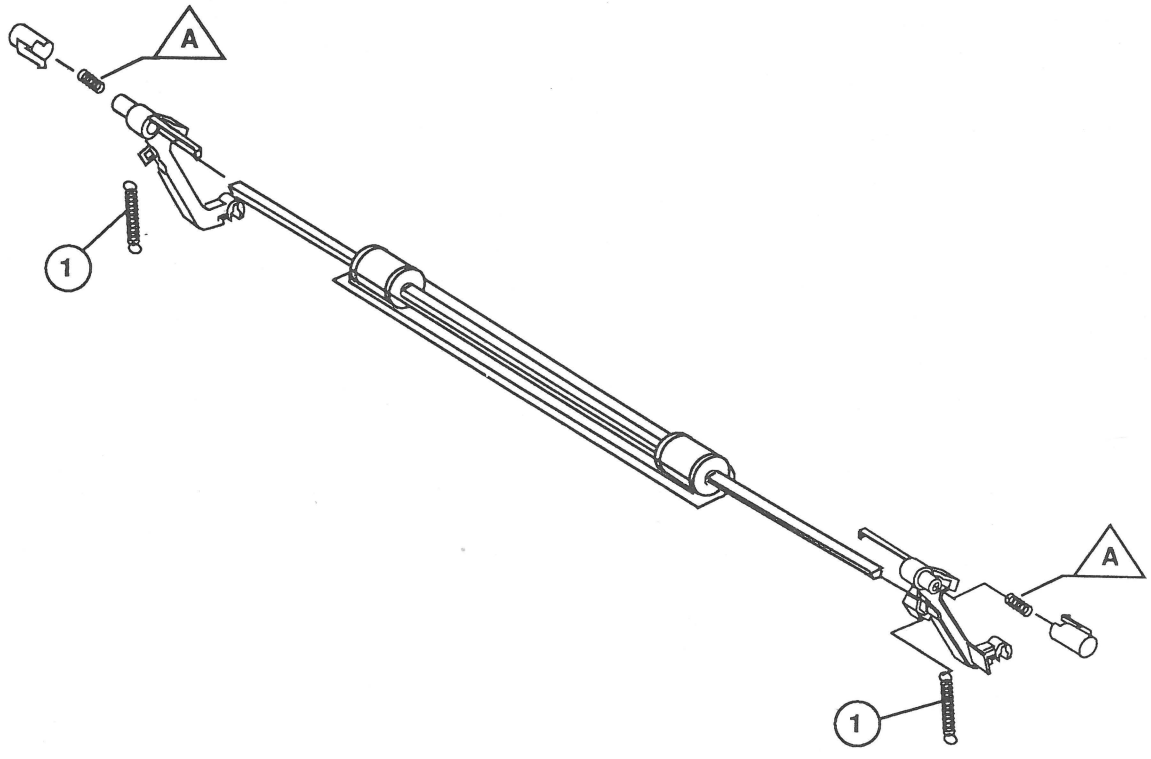


Figure 10

❑ SHIFT GEAR ASSEMBLY (Figure 9)

Item	Part No.	Description
–	076-0150	Shift Gear Assembly

❑ PAPER BAIL ASSEMBLY (Figure 10)

Item	Part No.	Description
–	076-0154	Paper Bail Assembly
1	957-0041	Spring, Bail Roller Arm (5/pk)

Note: Some of the other parts shown in this diagram are available as part of the Miscellaneous Hardware Kit. Refer to Miscellaneous Hardware Kit for further information. This part is not available separately.

A Spring, Bail Roller Shaft (3/pk)

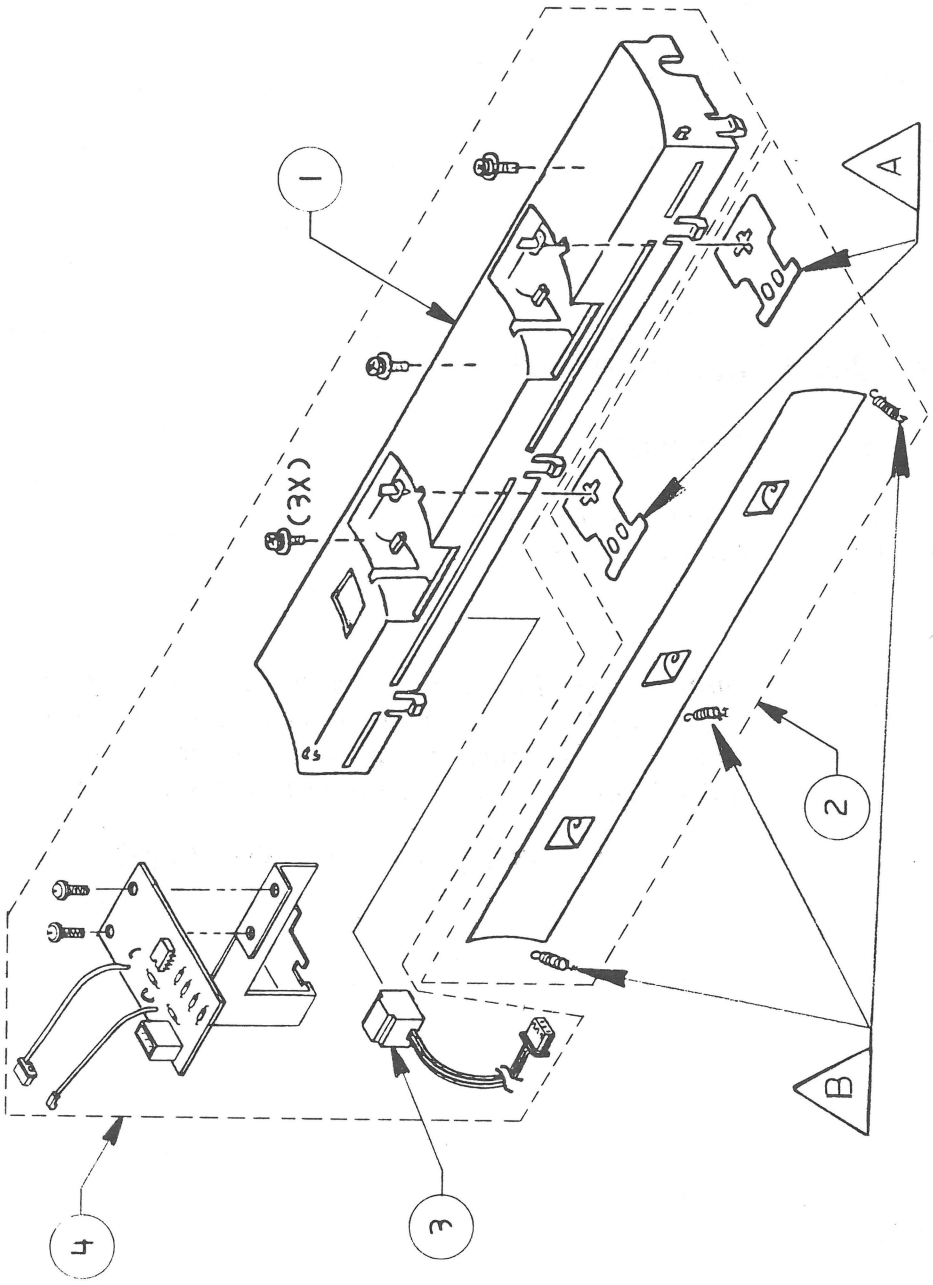


FIGURE 12

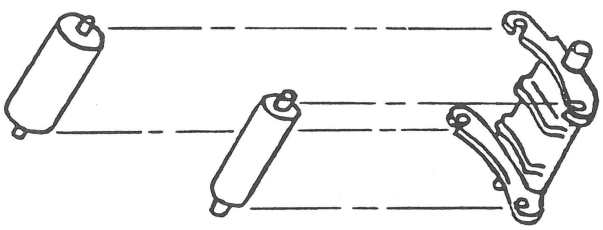


FIGURE 11

❑ PINCH ROLLER ASSEMBLY (Figure 11)

Item	Part No.	Description
–	076-0155	Pinch Roller Assembly

❑ PAPER GUIDE ASSEMBLY (Figure 12)

Item	Part No.	Description
1	949-0131	Paper Guide for Optical Sensor
2	076-0305	Paper Deflector and Springs
3	925-0008	Optical Paper-Out Sensor
4	076-0250	Optical Sensor Kit Assembly

- The Optical Sensor Kit Assembly includes:

  - Paper Guide for Optical Sensor
  - Optical Paper-Out Sensor
  - Optical Sensor Daughterboard Assembly (not available individually)

Note: Some of the other parts shown in this diagram are available as part of the Miscellaneous Hardware Kit. Refer to Miscellaneous Hardware Kit for further information. These parts are not available separately.

A	Plate, Pinch Roller Spring (3/pk)
B	Spring, Deflector (3/pk)

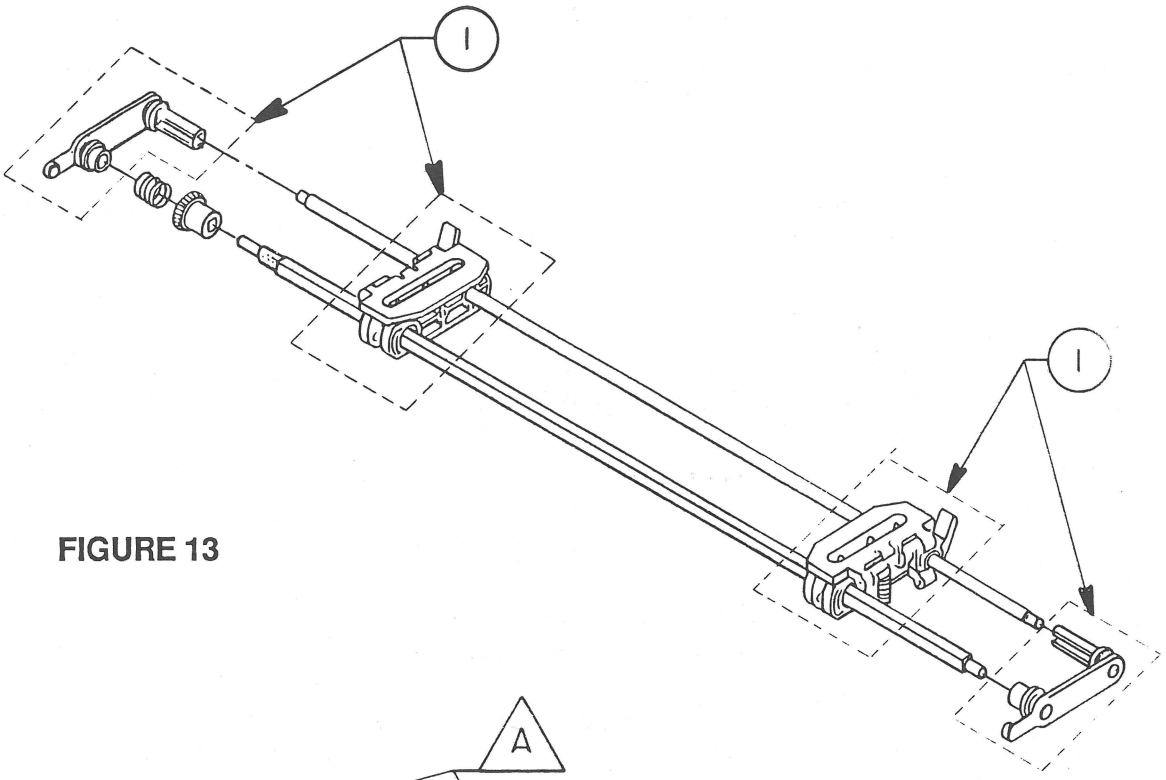


FIGURE 13

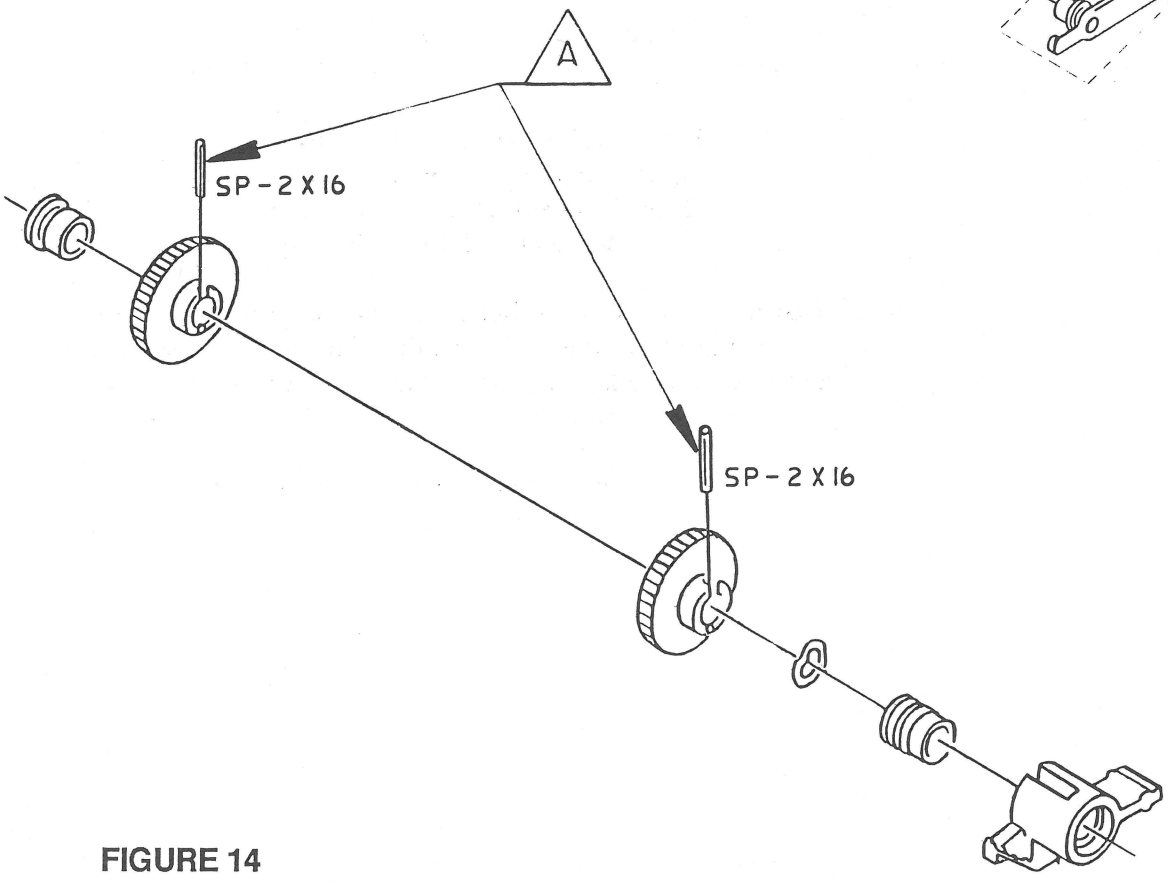


FIGURE 14

❑ TRACTOR ASSEMBLY (Figure 13)

Item	Part No.	Description
–	076-0152	Tractor Assembly (includes all parts shown)
1	076-0151	Tractor with Bush (includes only items marked "1")

❑ PLATEN ASSEMBLY (Figure 14)

Item	Part No.	Description
–	076-0153	Platen Assembly Parts without Platen

Note: Some of the other parts shown in this diagram are available as part of the Miscellaneous Hardware Kit. Refer to Miscellaneous Hardware Kit for further information. These parts are not available separately.

A Spring, Pin, D-2 x 16 (3/pk)

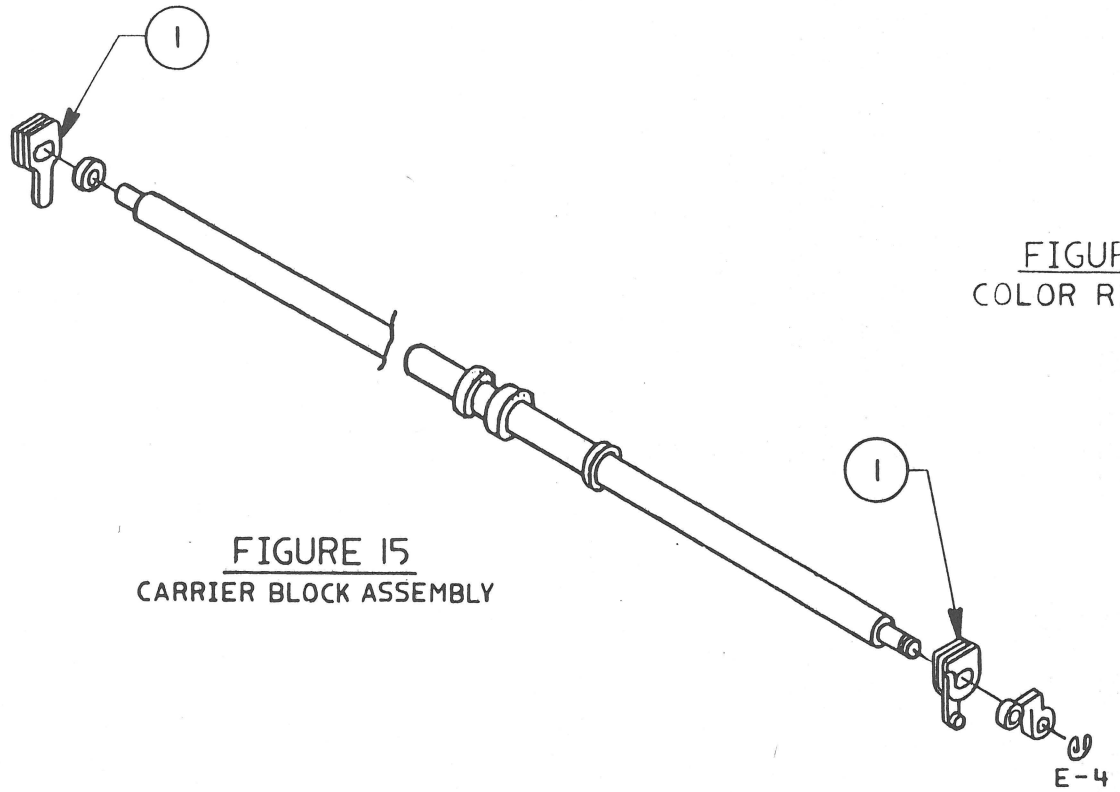


FIGURE 15
CARRIER BLOCK ASSEMBLY

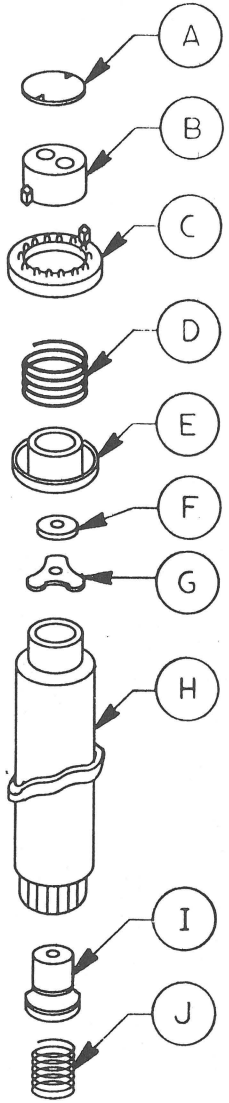


FIGURE 16
COLOR RIBBON ASSY.

❑ CARRIER BLOCK ASSEMBLY (Figure 15)

Item	Part No.	Description
–	076-0157	Carrier Block Assembly—includes all parts shown
1	958-0006	Bushing, Carrier Shaft (10 PK)

❑ COLOR RIBBON ASSEMBLY (Figure 16)

Item	Part No.	Description
–	076-0158	Color Ribbon Assembly

"Color Ribbon Assembly" consists of the items listed below. They are not available for purchase separately, but are identified to assist you in assembling them. Instructions for assembly are located in Section 3, Take-Apart.

A Stopper Seal
B Stopper
C Adjust Knob
D Rock Spring
E Adjust Collar
F Sift Cam Washer
G Wave Washer
H Sift Cam Ribbon
I Adjust Nut
J Spring Adjust

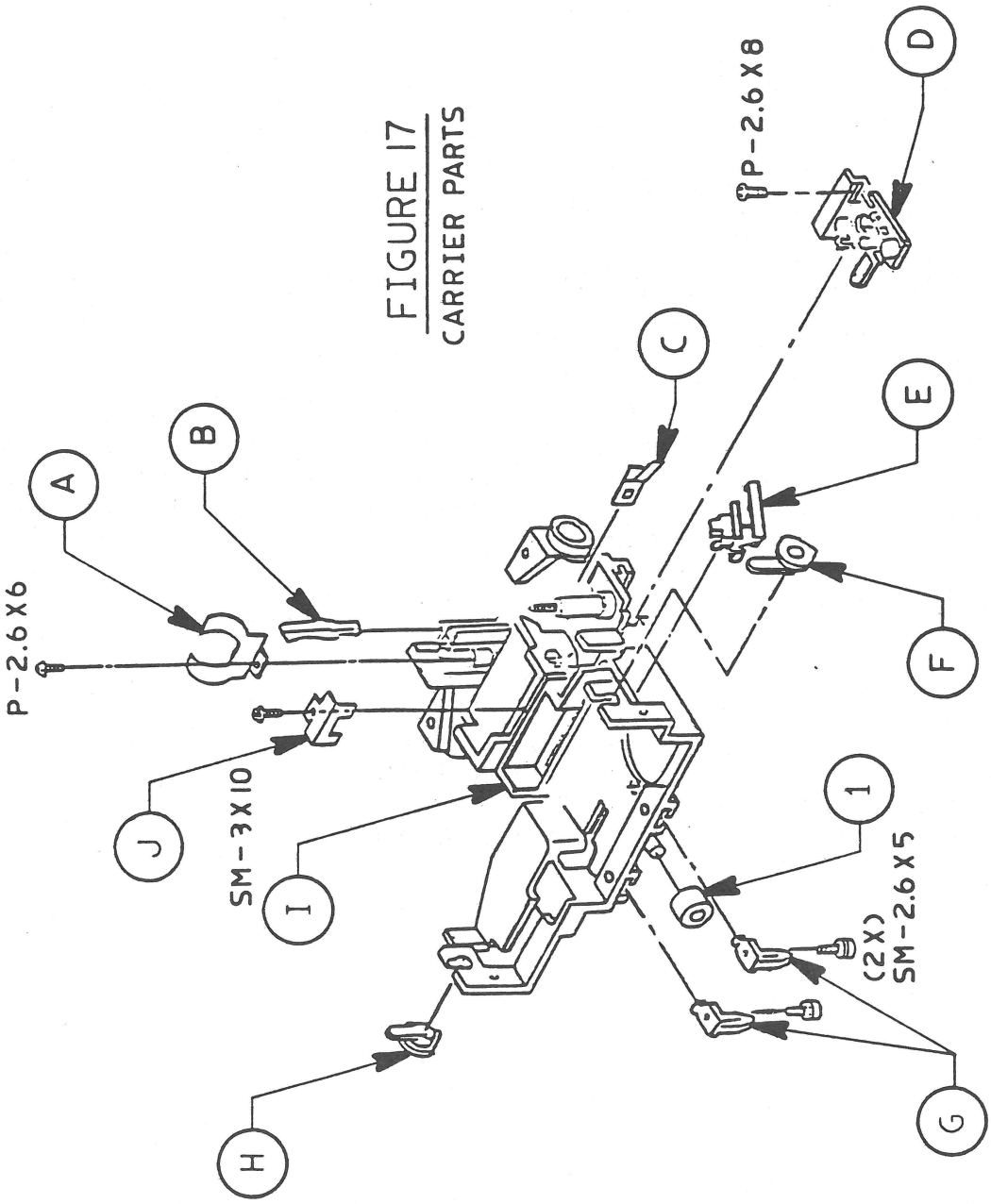


FIGURE 17
CARRIER PARTS
P-2.6X8
P-2.6X6
SM-3X10
(2X)
SM-2.6X5
A
B
C
D
E
F
G
H
I
J
1

❑ CARRIER PARTS (Figure 17)

Item	Part No.	Description
–	076-0160	Carrier Parts
1	949-0129	Carrier Roller (10 PK)

"Carrier Parts" consists of the items listed below. They are not available for purchase separately, but are identified to assist you in assembling them. Instructions for assembly are located in Section 3, Take-Apart.

A Spring Head
B Print Head Clamp
C Tab, Ribbon Shift Spring
D Ribbon Kit
E Lead Wire Guide
F Tab, Ribbon Frame, Right
G Carrier Clamp
H Tab, Ribbon Frame, Left
I Carrier
J Belt Guide

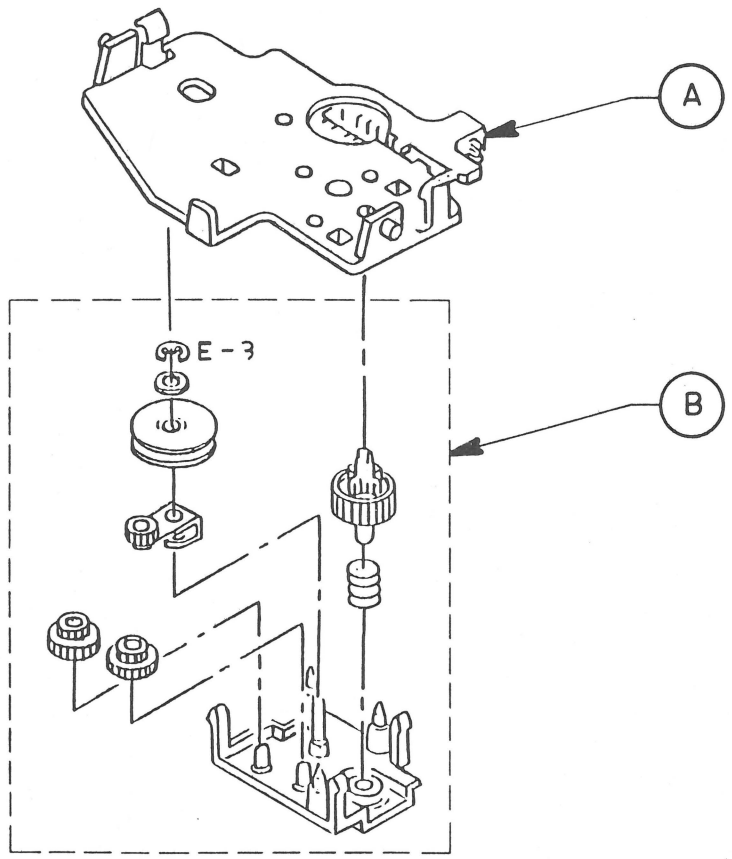


FIGURE 18

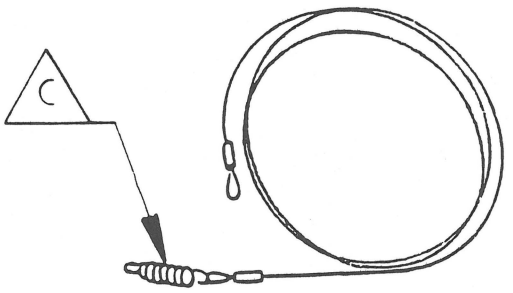


FIGURE 19

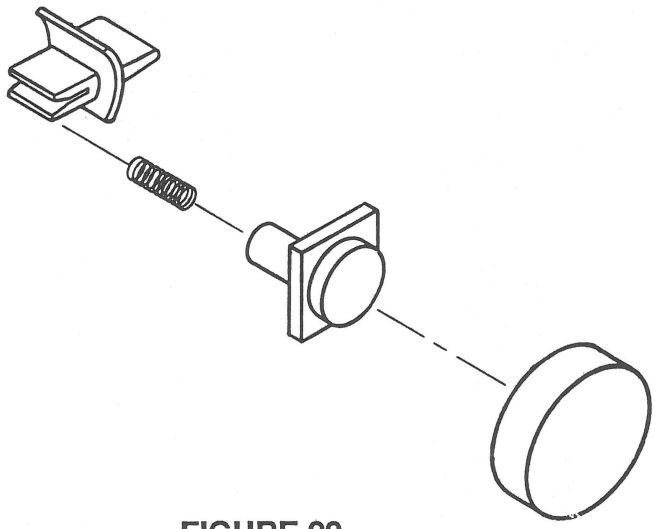


FIGURE 20

❑ RIBBON FRAME ASSEMBLY (Figure 18)

Item	Part No.	Description
–	076-0159	Ribbon Frame Assembly

"Ribbon Frame Assembly" consists of the parts listed below. Items are not available for purchase separately, but are identified to assist you in assembling them. Instructions to assemble are in Section 3, Take-Apart.

A Ribbon Plate
B Ribbon Wire Assembly

❑ RIBBON WIRE AND SPRING (Figure 19)

Item	Part No.	Description
–	935-0001	Ribbon Wire and Spring

Note: Some of the other parts shown in this diagram are available as part of the Miscellaneous Hardware Kit. Refer to Miscellaneous Hardware Kit for further information. These parts are not available separately.

C Spring, Ribbon Wire (3/pk)

❑ PLATEN KNOB ASSEMBLY (Figure 20)

Item	Part No.	Description
–	076-0164	Platen Knob Assembly, White
–	076-0239	Platen Knob Assembly, Platinum

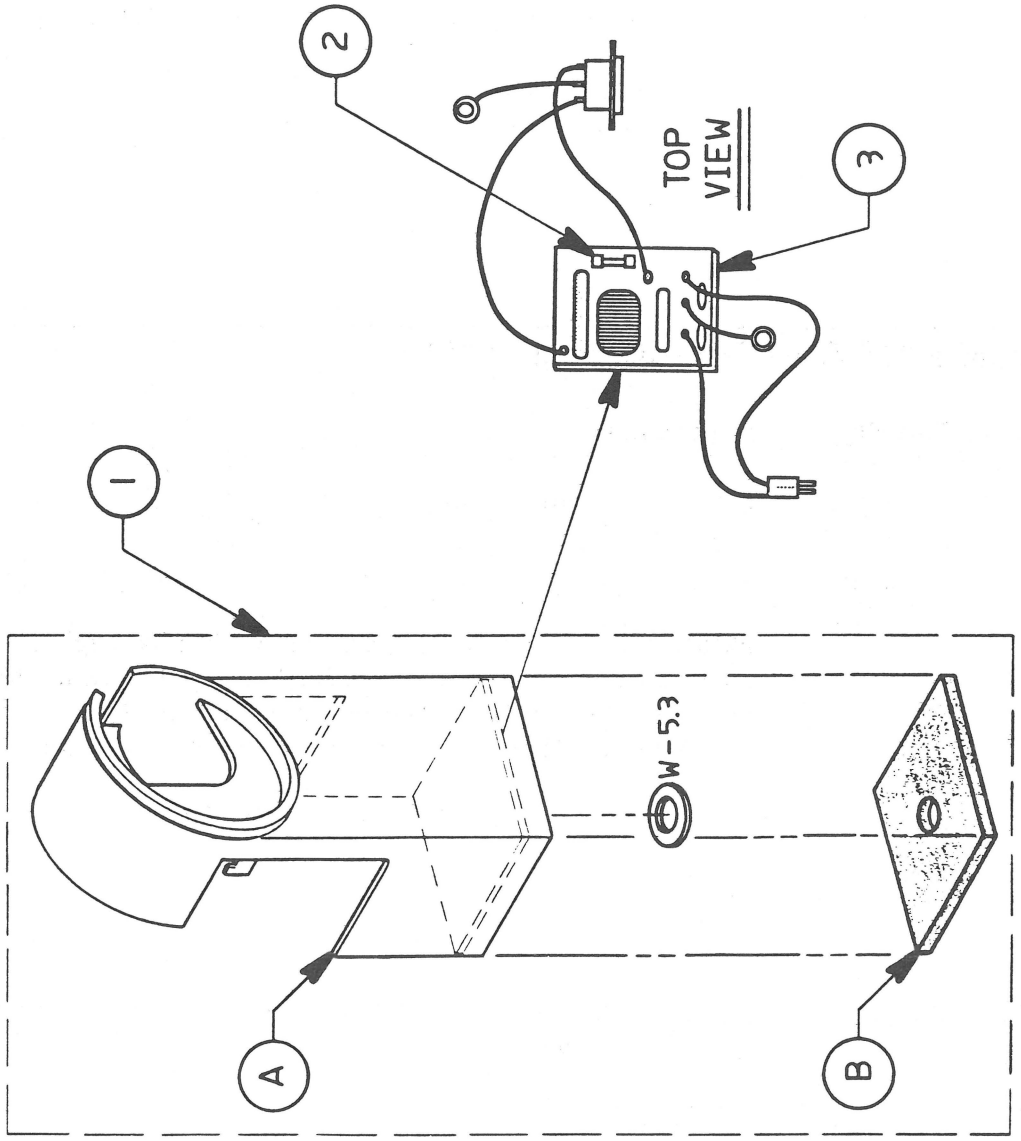


FIGURE 21

SUPPORT LEG ASSEMBLY (RIGHT)

❑ SUPPORT LEG ASSEMBLY (Right) (Figure 21)

Item	Part No.	Description
1	076-0163	Support Leg Assembly (Right), White
	076-0238	Support Leg Assembly (Right), Platinum
2	941-0001	Fuse MT4-2A
3	961-0001	Noise Filter PCB Assembly

"Support Leg Assembly (Right)" consists of the parts listed below. These items cannot be purchased separately; they are identified to assist you in assembling them. Instructions to assemble are located in Section 3, Take-Apart.

A Support Leg, Right
B Support, Rubber Foot

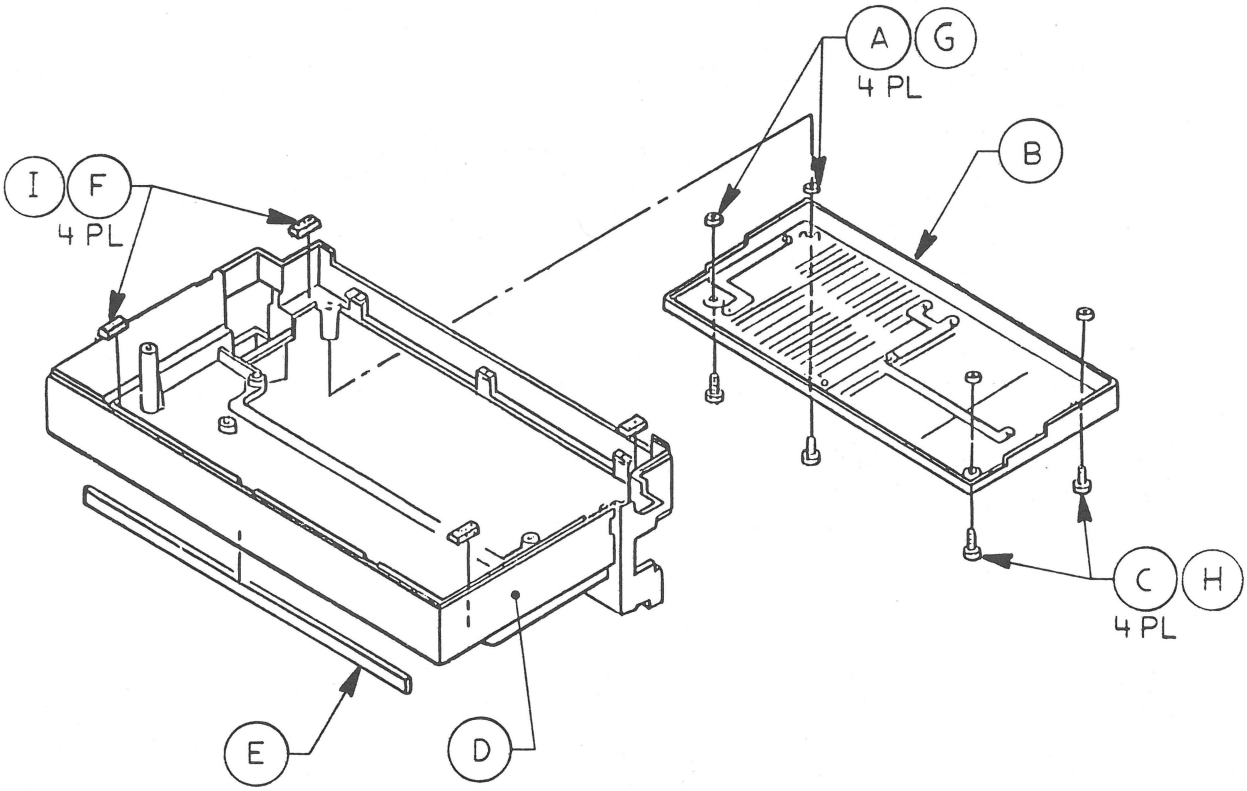


FIGURE 22

❑ BOTTOM COVER ASSEMBLY (Figure 22)

Item	Part No.	Description
–	076-0161	Bottom Cover Assembly, White
–	076-0236	Bottom Cover Assembly, Platinum

This assembly includes:

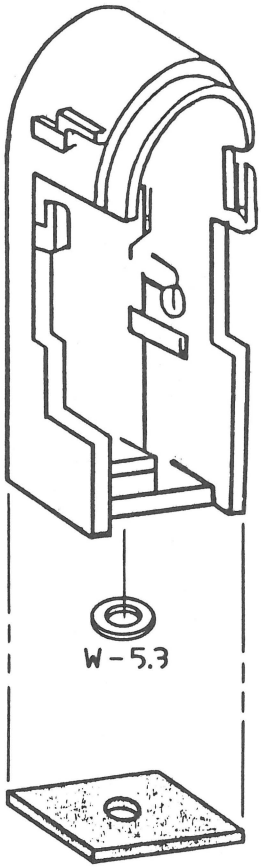
A	Access Stopper
B	Access Cover
C	Access Screw
D	Bottom Cover
E	Rubber Foot
F	Print Cushion Rubber

Note: Some of the other parts shown in this diagram are available as part of the Miscellaneous Hardware Kit. Refer to Miscellaneous Hardware Kit for further information. These parts are not available separately.

G	Screw, Access Cover, Beige (3/pk)
H	Screw, Access Cover, Platinum (3/pk)
I	Rubber Printer Cushion (3/pk)

FIGURE 23

SUPPORT LEG ASSEMBLY (LEFT)



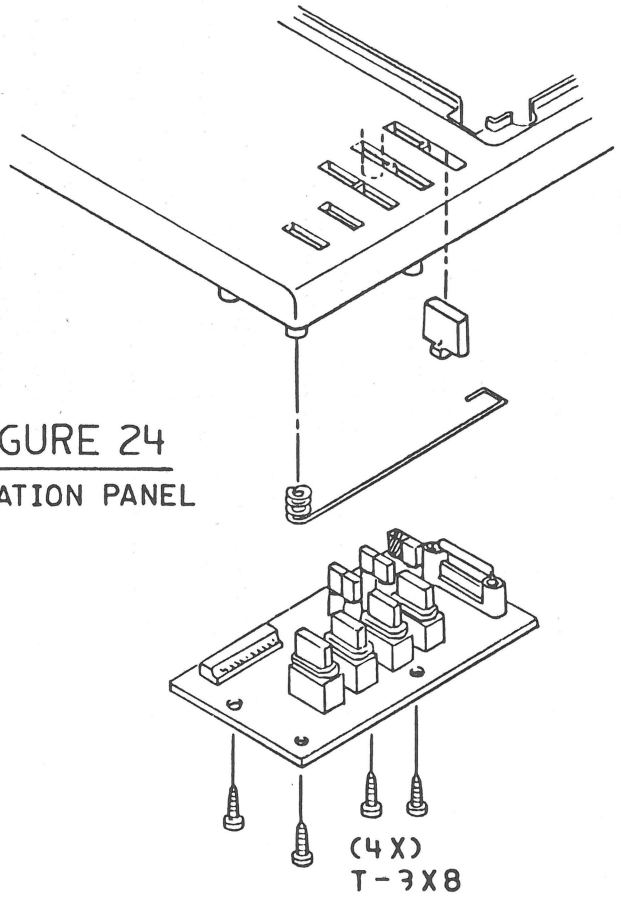


FIGURE 24

OPERATION PANEL

❑ SUPPORT LEG ASSEMBLY (Figure 23)

Item	Part No.	Description
-	076-0162	Support Leg Assembly (Left), White
-	076-0237	Support Leg Assembly (Left), Platinum

❑ OPERATION PANEL (FIGURE 24)

Item	Part No.	Description
-	076-0165	Operation Panel, White
-	076-0240	Operation Panel, Platinum

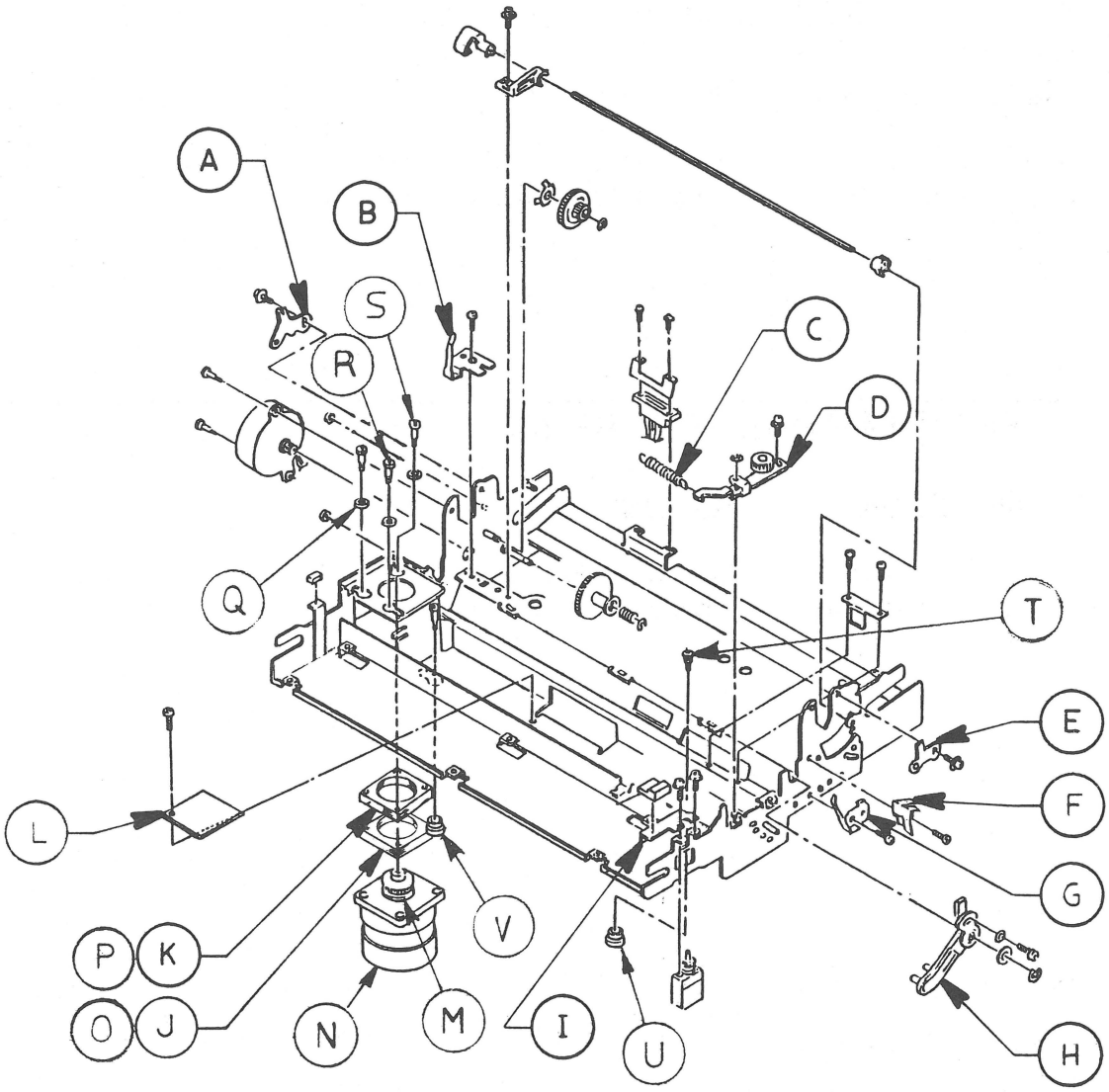


FIGURE 25

❑ FRAME PARTS (Figure 25)

Item	Part No.	Description
–	076-0200	Frame Parts

"Frame Parts" consists of the items listed below. Items are not available for purchase separately, but are identified to assist you in assembling them.

A	Plate, Platen Bush (Left)
B	Plate, Carrier Shaft Spring (Left)
C	Spring, Carrier Pulley Arm
D	Arm, Carrier Pulley
E	Plate, Platen Bush (Right)
F	Plate, Free Lever Spring
G	Plate, Carrier Shaft Spring (Right)
H	Lever (A), Impression Control
I	Cover, Switch Cable
J	Cushion (A), Carrier Motor
K	Cushion (B), Carrier Motor
L	Guide, Flexible Cable

–	076-0342	Carrier Motor Kit

"Motor Parts" consists of the items below. Items are not available for purchase separately, but are identified to assist you in assembling them.

M	Pulley
N	Carrier Motor
O	Cushion (B), Carrier Motor (3/pk)
P	Cushion (A), Carrier Motor (3/pk)
Q	Cushion (C), Carrier Motor (3/pk)

Note: Some of the other parts shown in this diagram are available as part of the Miscellaneous Hardware Kit. Refer to Miscellaneous Hardware Kit for further information. These parts are not available separately.

R	Screw, Carrier Motor Set (3/pk)
S	Screw, Base (3/pk)
T	Screw, Base Plate (3/pk)
U	Grommet (A), Base Plate (3/pk)
V	Grommet (B), Base Plate (3/pk)

❑ MISCELLANEOUS HARDWARE KIT

Item	Part No.	Description
–	076-0317	Miscellaneous Hardware Kit

Parts listed below are included in the Miscellaneous Hardware Kit. The quantities listed are included in the kit.

The parts listed below are not sold separately.

Description	See Figure #
Screw, Carrier Motor Set (3/pk)	25
Screw, Base Plate (3/pk)	25
Screw, Base (3/pk)	25
Screw, Head PCB (3/pk)	5
Screw, Access Cover, Beige (3/pk)	22
Screw, Access Cover, Platinum (3/pk)	22
Screw, Pan Head, 2.6 x 8 (3/pk)	5
Screw, Tapping, 2.6 x 5 (3/pk)	5
Plate, Pinch Roller Spring (3/pk)	2, 12
Bushing, Ribbon Frame, Right (3/pk)	5
Bushing, Ribbon Frame, Left (3/pk)	5
Rubber Printer Cushion (3/pk)	22
Stopper Access (3/pk)	22
Spring, Bail Roller Shaft (3/pk)	2, 10
Spring, Ribbon Wire (3/pk)	5, 19
Spring, Pin, D2 x 16 (3/pk)	14
Spring, Deflector (3/pk)	11
Grommet (A), Base Plate (3/pk)	25
Grommet (B), Base Plate (3/pk)	25

Apple Technical Procedures

ImageWriter II

SheetFeeder Illustrated Parts List

❑ CONTENTS

IPL.3 Overview (Figure 1)
IPL.5 Housing & PCB Assembly (Figure 2)
IPL.7 Frame Assembly (Figure 3)
IPL.9 Paper Tray Assembly (Figure 4)

The figures and lists above include all parts that can be purchased separately from Apple for the ImageWriter II SheetFeeder, along with their part numbers. These are the only parts available from Apple. See your Service Programs manual for prices.

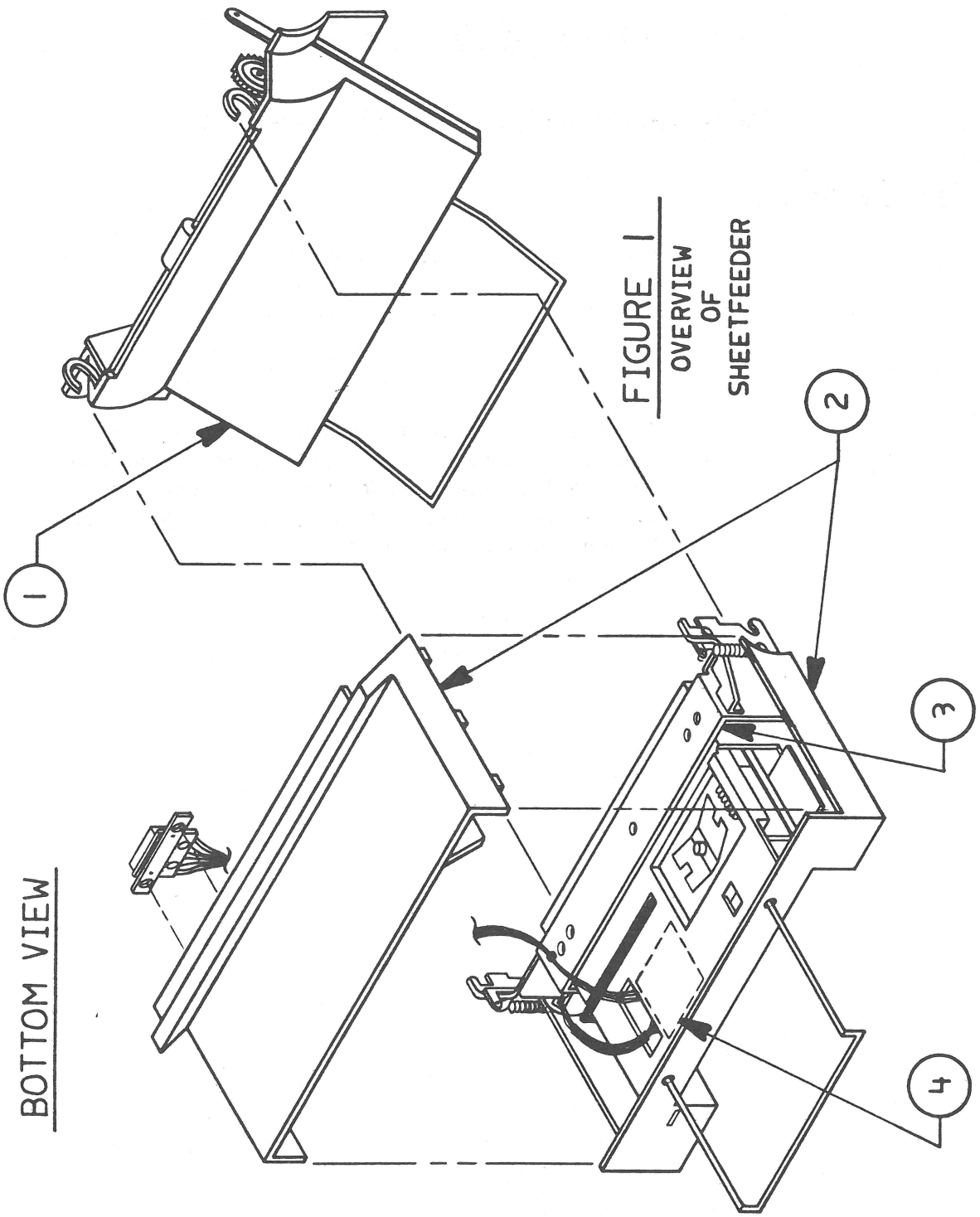


FIGURE 1
OVERVIEW OF SHEETFEEDER

❑ OVERVIEW (Figure 1)

Item	Part No.	Description
-	661-0329	ImageWriter II SheetFeeder, White
	661-0401	ImageWriter II SheetFeeder, Platinum
1	076-0171	SheetFeeder Paper Tray Assembly, White (see Figure 4.)
	076-0242	SheetFeeder Paper Tray Assembly, Platinum (See Figure 4.)
2	076-0169	SheetFeeder Housing, White (See Figure 2, Item 1.)
	076-0241	SheetFeeder Housing, Platinum (See Figure 2, Item 1.)
3	076-0170	SheetFeeder Frame Assembly (See Figure 3.)
4	076-0172	SheetFeeder PCB Assembly (See Figure 2, Item 2.)

Note: The ImageWriter II SheetFeeder must be turned upside down to access any parts for servicing. Therefore, this illustration shows the **underside** of the assembly.

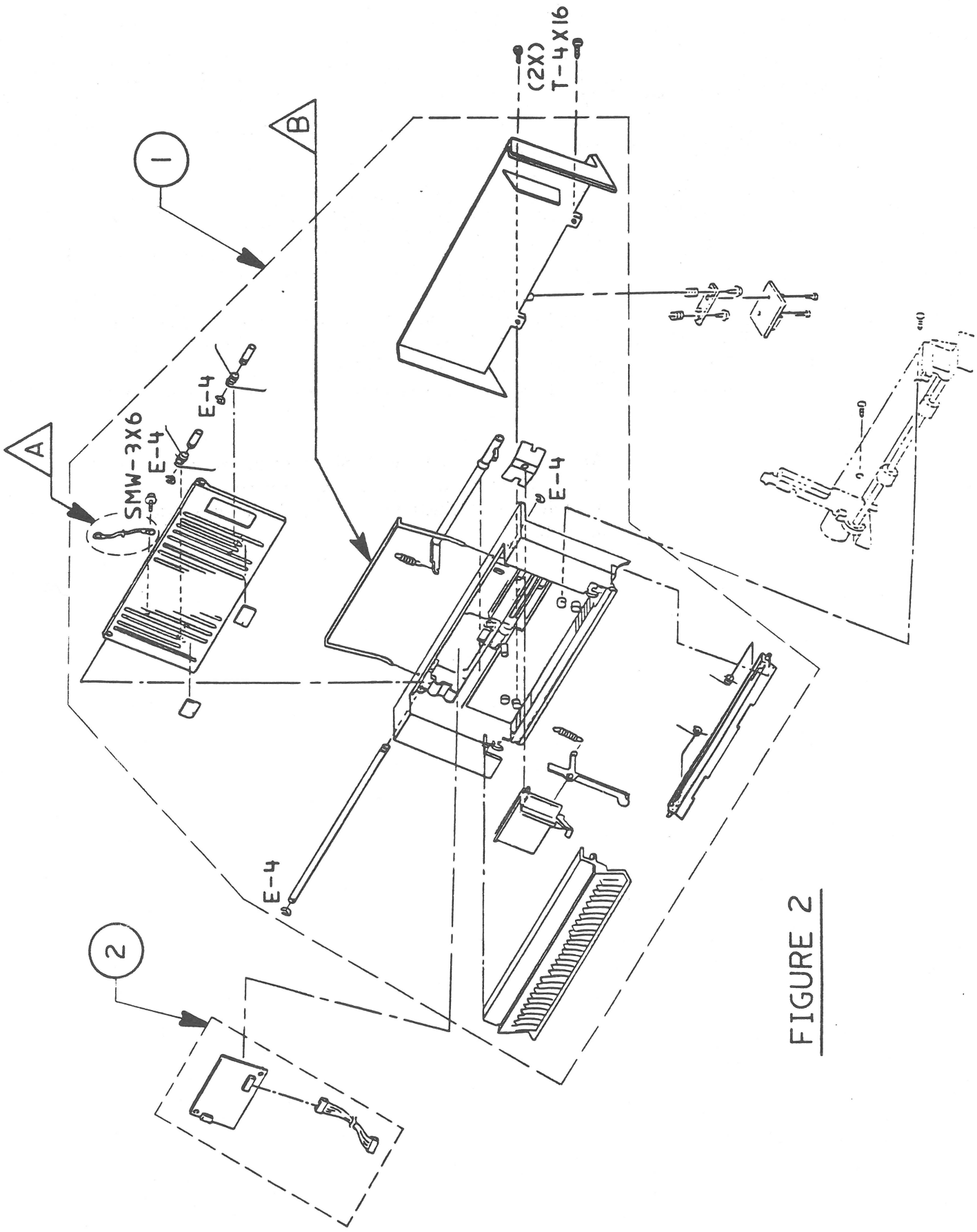


FIGURE 2

❑ HOUSING AND PCB (Figure 2)

Item	Part No.	Description
1	076-0169	SheetFeeder Housing, White
	076-0241	SheetFeeder Housing, Platinum
2	076-0172	SheetFeeder PCB Assembly

The following part is not included in the SheetFeeder Housing Assembly, nor is it available for purchase separately. If a repair requires this part, it must be retained from the customer's unit.

A Grounding Strap
B Paper-Support Rod

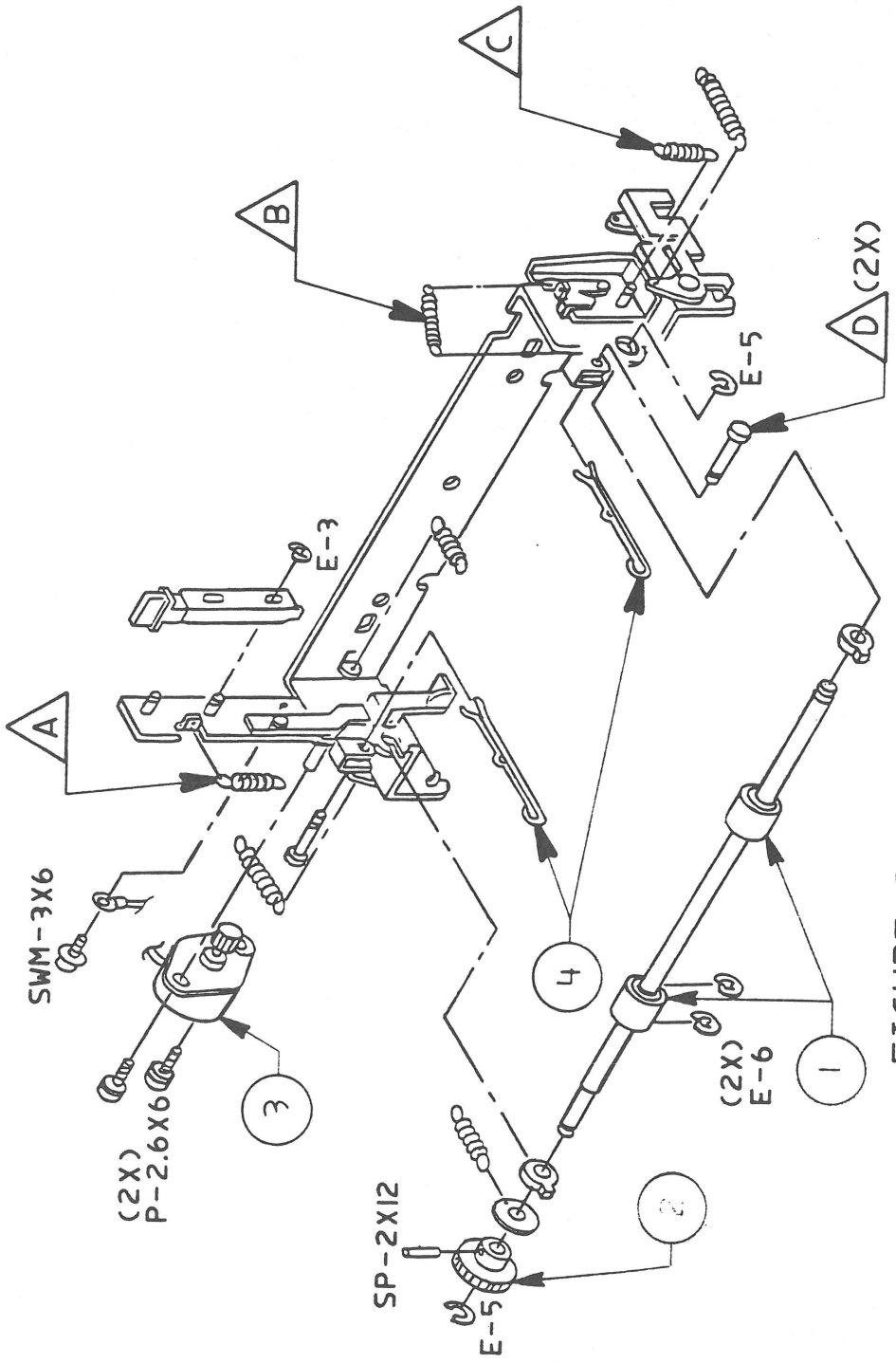


FIGURE 3
FRAME ASSEMBLY

❑ FRAME ASSEMBLY (Figure 3)

Item	Part No.	Description
-	076-0170	SheetFeeder Frame Assembly, White
	076-0321	SheetFeeder Frame Assembly, Platinum
1	984-0001	Feed Roller
2	076-0271	Gear, Feed Roller
3	959-0015	ImageWriter II SheetFeeder Motor
4	076-0270	Pin Pivot

The following parts are not included in the SheetFeeder Frame Assembly, and they cannot be purchased separately. If a repair requires any of these parts, they must be retained from the customer's unit.

A Spring
B Spring
C Spring
D Pivot Shaft

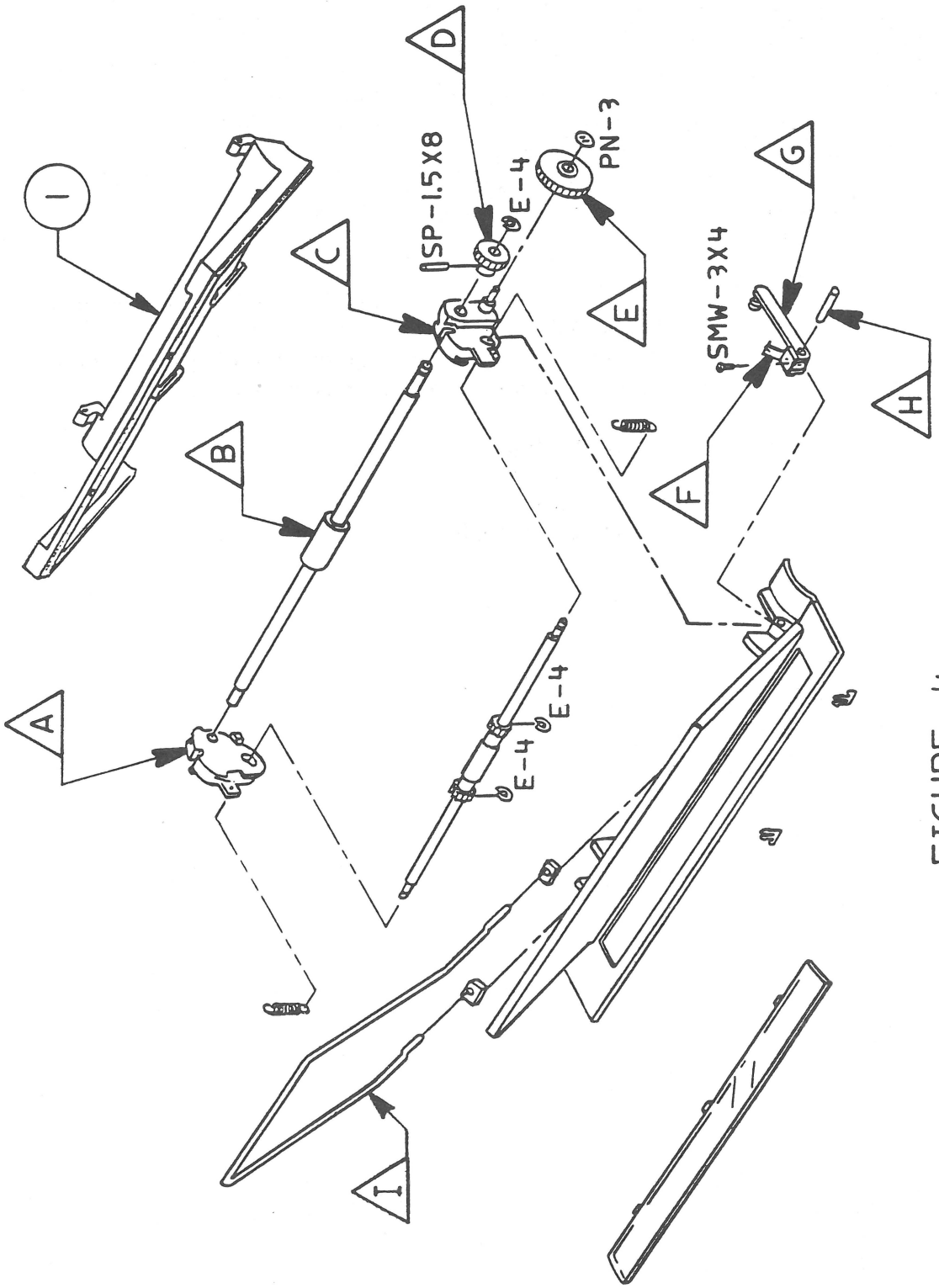


FIGURE 4

PAPER TRAY ASSEMBLY

❑ PAPER TRAY ASSEMBLY (Figure 4)

Item	Part No.	Description
-	076-0171	SheetFeeder Paper Tray Assembly, White
	076-0242	SheetFeeder Paper Tray Assembly, Platinum
1	949-0088	Upper Paper Tray, White
	949-0136	Upper Paper Tray, Platinum

The following parts are not included in the assembly, and they cannot be purchased separately. If a repair requires any of these parts, they must be retained from the customer's unit.

A Right Roller Holder
B Roller Shaft
C Left Roller Holder
D Roller Gear
E Idler Gear
F Noise Plate Spring
G Paper Tray Detent Plate
H Paper Tray Detent Shaft
I Paper-Support Rod

Note: For number 1, 949-0088 is included with 076-0171 and 949-0136 is included with 076-0242.

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ImageWriter II/L

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ImageWriter II/L

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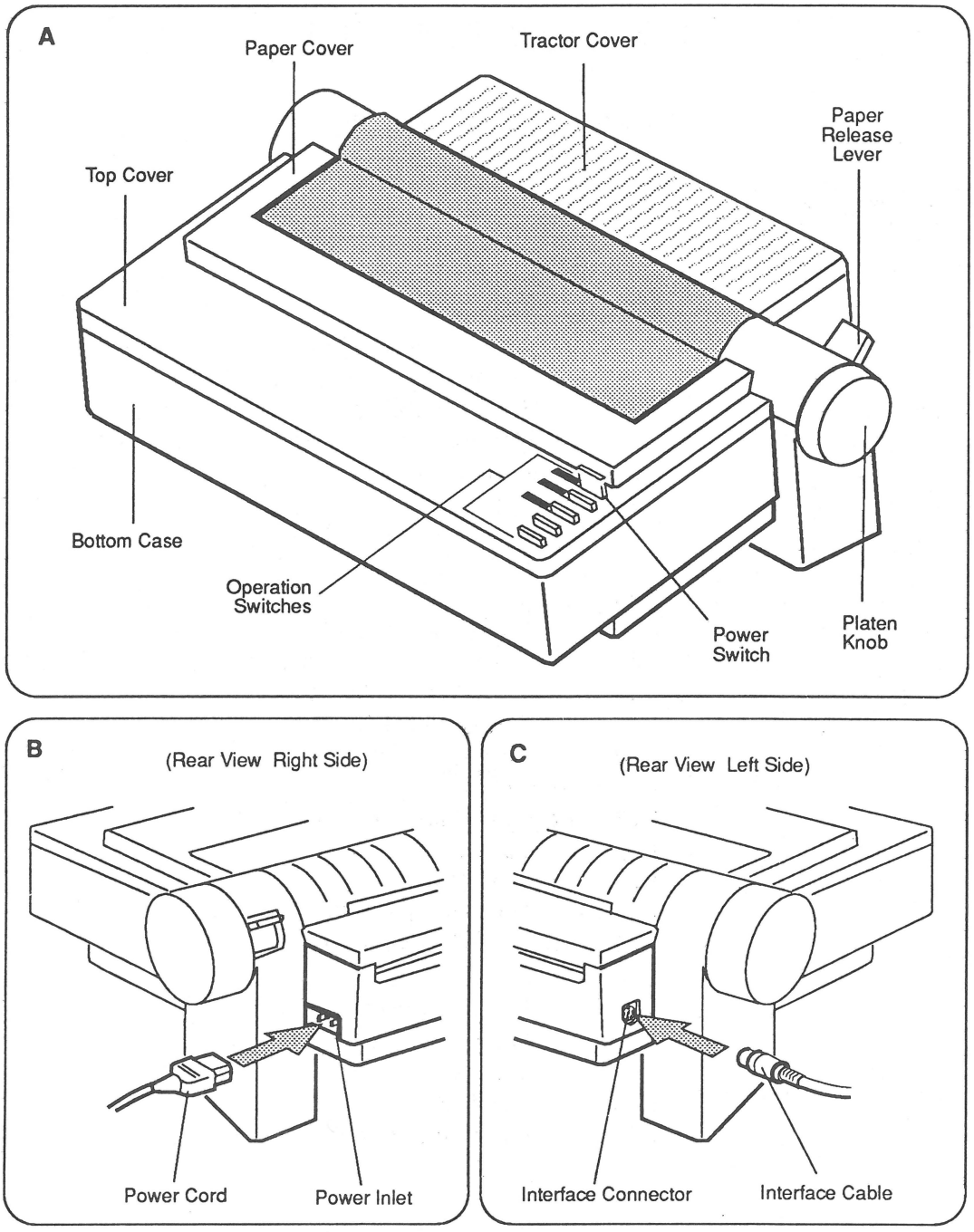

Figure 1-1 Unit ID, Power/Interface Cables

❑ INTRODUCTION

The ImageWriter® II/L printer is an improved version of the ImageWriter II. Basically the operation of the printer is the same as the ImageWriter II so the features listed below are the same. The design of the printer has changed. Even though the printer looks the same on the outside **(Figure 1-1A)**, much has changed in the way the modules are put together. **Figure 1-1B** shows where the AC power cord plugs in and **Figure 1-1C** shows where the interface cable goes.

Features

Listed below are the features of the ImageWriter II/L:

Multiple Print Methods	Draft—240 characters per second Standard—180 characters per second Near Letter Quality—25 characters per second
Auto Paper Load	Automatically loads paper when the form-feed button is pressed
Color Capability	Provides color-option printing with a four-color ribbon
Sheet Feeder	Accepts a single-bin sheet feeder
Option Card	Accepts the AppleTalk card
MouseText	Contains 32 special characters for use on Apple II computers
Self-Identification	Automatically determines its operational mode by checking to see if there is a color ribbon, a sheet feeder, or an option card installed

❑ MODULE IDENTIFICATION

Figures 1-2, **1-3** and **1-4** on the following pages show the major assemblies and subassemblies of the printer and the location of the connectors and fuses.

Major Assemblies

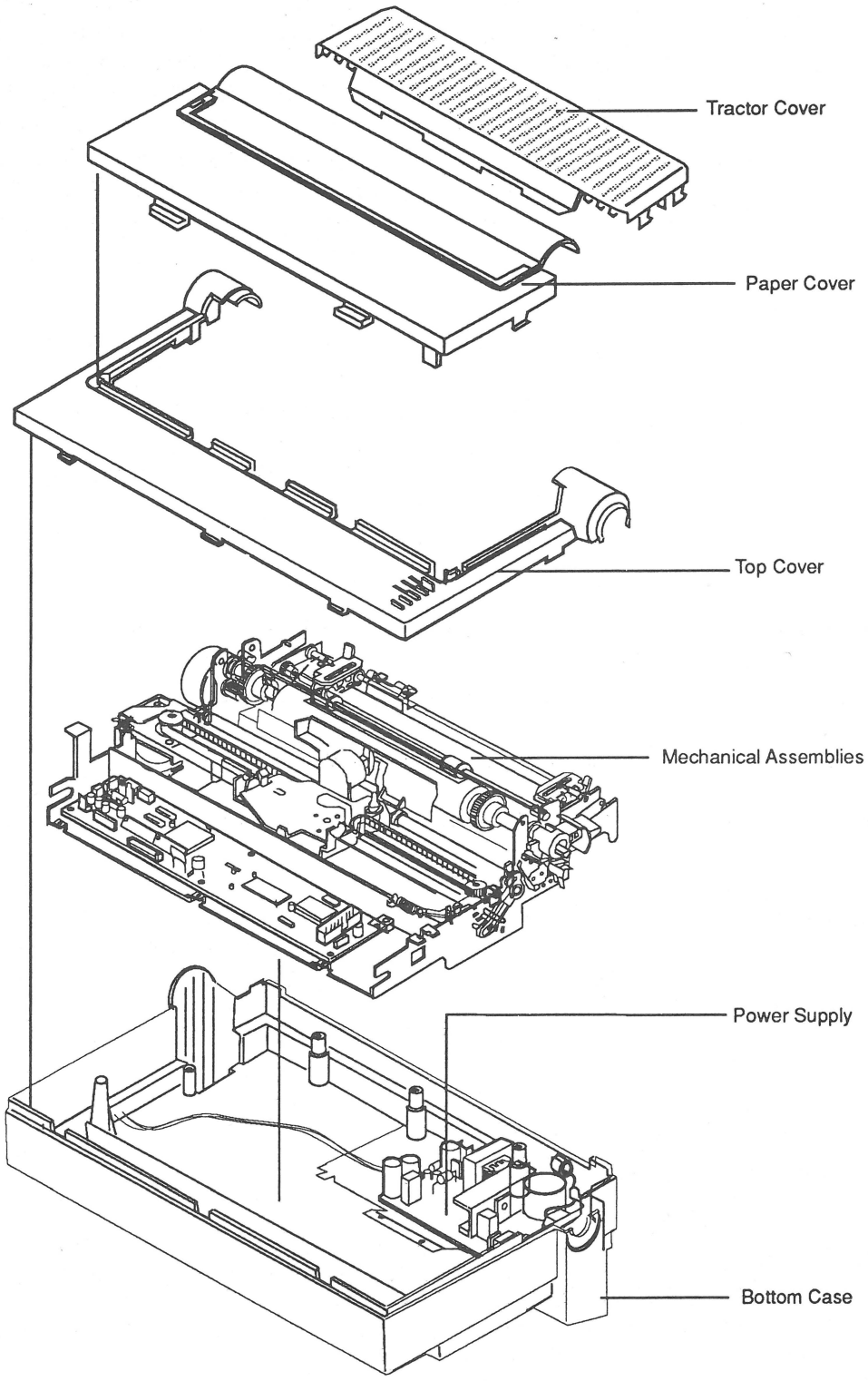

Figure 1-2 Major Assembies

Subassemblies

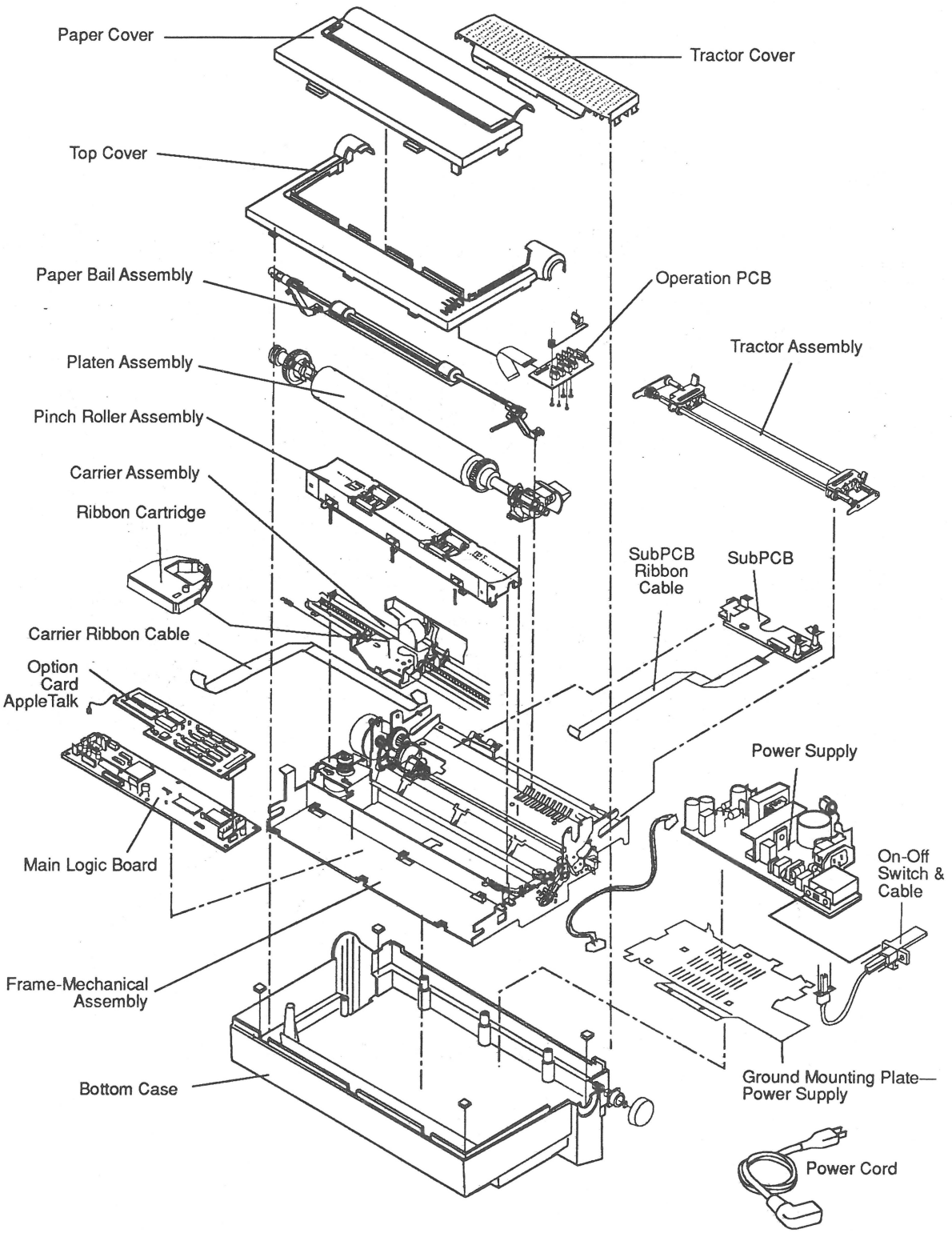

Figure 1-3 Subassemblies

Connectors and Fuses

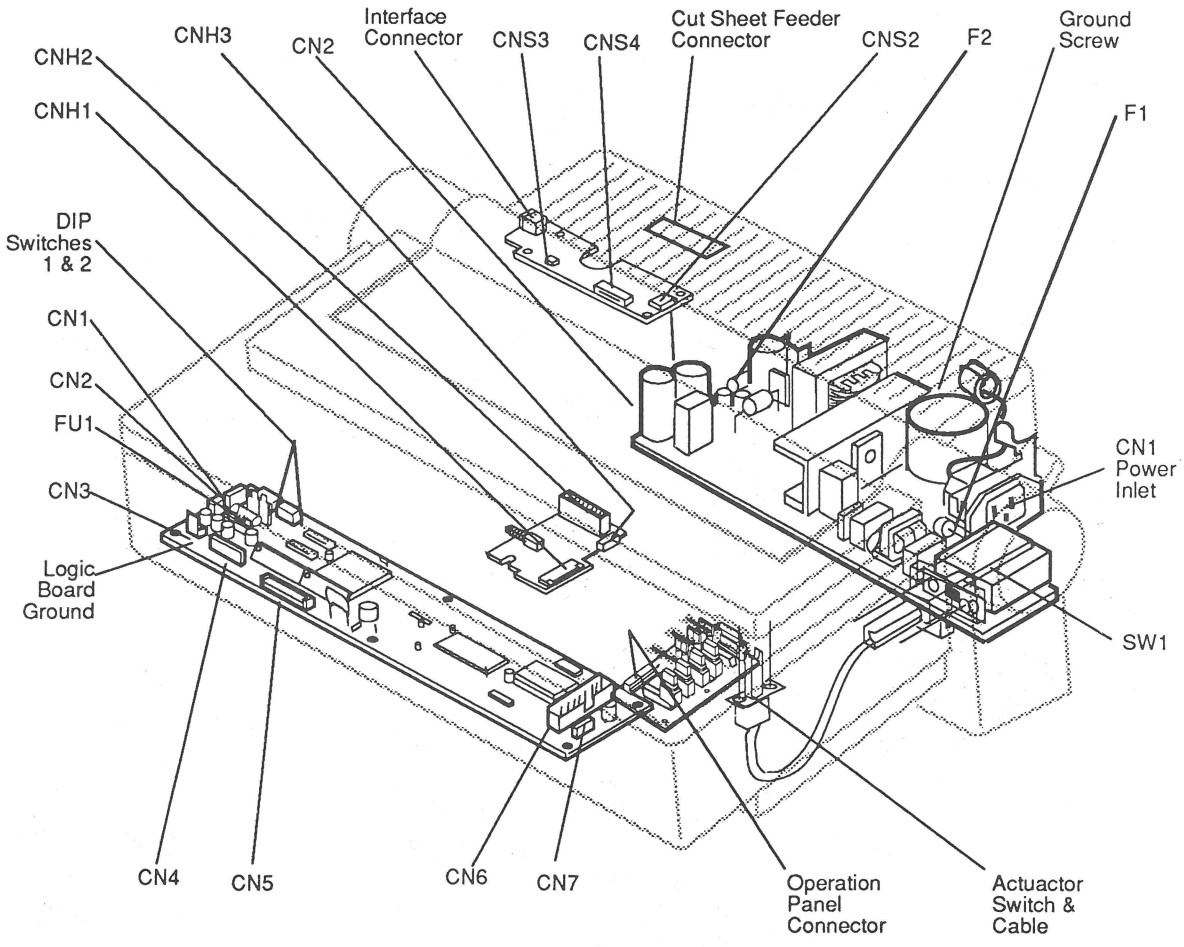

Figure 1-4 Connector and Fuse Locations

❑ SPECIFICATIONS

Print Method (Dot Matrix)	
Draft Mode	250 cps; 25 ips at 10 cpi
Standard Mode	180 cps; 18 ips at 10 cpi
NLQ Mode	25 cps
Print Throughput	100 ipm at 80 dpi
Print Head	9 wires
Printed Dot Centers	0.0139" (0.353 mm) nominal
Wire diameter	
Standard	0.0118" (0.300 mm) nominal
Japan	0.0098" (0.250 mm) nominal
Response Time	1440 Hz
Life	
Standard	4 x 108 strokes/wire
Japan	2 x 108 strokes/wire
Graphics Duty Cycle	25% minimum
Character Sets	ASCII (96 characters) 6 European sets MouseText (32 characters)
Input Buffer	254K bytes
Paper Feed Method	Friction feed, adjustable tractors, and automatic single-sheet loader
Paper Feed Accessories	Automatic cut-sheet feeder
Direction	Bidirectional (friction feed or tractor feed)
Forms	
Type	Single sheets, sprocket feed, multicopy (original + 3 copies), single-width labels
Thickness	0.002" to 0.011" (0.05 mm to 0.28 mm) equivalent to 15# to 25# bond
Length	3.5" minimum to n" maximum (n is typically 11 or 14 for cut sheets)

Specifications — continued

Ribbon	Fabric ribbon; black or 4-color (cannot use color with Kanji print head)
Line Voltage	
USA/Japan	85 to 132 VAC; 48 Hz to 62 Hz
Europe/Australia	185 to 265 VAC; 48 Hz to 62 Hz
Power Consumption	
Stand-by	20 Watts max.
Operation	180 Watts max.
Interface	Standard Asynchronous—option board can be added to provide other interfaces such as LocalTalk
Asynchronous Operation	Switch selectable; Data ready/busy (Hardware handshake), or Xon / Xoff serial protocols
Connector	8-pin mini-DIN
Optional Connector	26-pin male
Data Format	Asynchronous serial/ no parity bit shall be sent
Data Transmission Speed	Switch selectable (300, 1200, 2400, and 9600 baud)
Environmental Conditions	
Temperature	
Operation	+10 to +40 degrees C
Storage (1 year)	-40 to +47 degrees C
Transit (72 hours)	-40 to +65 degrees C
Humidity (Noncondensing)	10% to 95% RH
Storage (6 months)	
Physical Dimensions	5" height 12" deep 17" width 25 lbs max. weight

❑ OPERATION PANEL

The operation panel consists of operating switches and indicator lights. **Figure 1-5** points out the location of each.

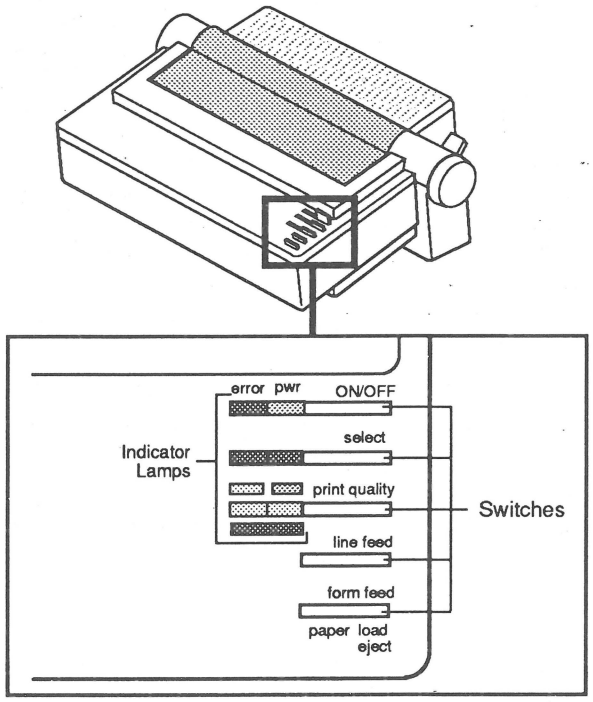

FIGURE 1-5 Operation Panel

Operating Switches

The operating switches are the buttons with which you control the printer.

Power Switch

The power switch turns the printer on and off.

Select Switch

The select switch toggles the printer between a selected (on-line) and a deselected (off-line) state. If printing is in progress when the select switch is pressed, the printer finishes printing the current line and a maximum of two additional lines, and stops printing.

If you want to clear the buffer, you must turn off the printer.

Pressing the select switch also clears a corrected error condition.

If an out-of-paper condition exists, pressing the select switch temporarily overrides the out-of-paper error to allow the print of one line. This process is repeatable as long as there is printable data in the printer buffer.

Print Quality Switch

The print quality switch allows the user to choose one of three printing modes. Pressing the print quality switch repeatedly changes the mode from the standard print mode, to the NLQ print mode, to the draft print mode, back to the standard print mode again. The print quality switch does not function unless the printer is in an off-line (deselected) state.

Line Feed Switch

The line feed switch does not function unless the printer is in an off-line (deselected) state. When the line feed switch is pressed, the printer feeds a line of paper. As long as the switch is held down, the printer performs four line feeds with a pause between each. Upon execution of the fifth line feed, the printer feeds paper continuously as long as the switch is depressed, until the top of the form is reached. Once the top of the form is reached, the printer feeds no more paper until the button is released and pressed again.

Form Feed Switch

The form feed switch does not function unless the printer is in an off-line (deselected) state. When the form feed switch is pressed, the printer feeds paper until the next top of form is reached.

The form feed switch performs a dual function when feeding single sheets. If the switch is pressed and no paper is present, the printer assumes a single sheet is being loaded. The printer feeds the single sheet up to the top of form position. If the switch is pressed and paper is present, the printer monitors the paper-off switch while feeding paper. If the printer detects an out-of-paper conditon before the top of form is reached, the printer assumes that single sheets are being fed. For the single sheet case, four inches of paper motion is added to the form feed to ensure that the page is properly ejected.

When an automatic cut-sheet feeder is present, the paper-loading sequence is slightly different. When the form feed switch is pressed with no paper present, the printer first rolls the platen to check if a single sheet had been inserted. If no paper is found, the printer loads a sheet from the automatic sheet feeder and positions it at the top-of-form position.

Indicators

The indicators are lights that let you know what state the printer is in.

Power

When lit, the power light indicates that power is on.

Select

When the select indicator is lit, the printer is on-line, in a ready state so that a transmission can take place.

Print Quality Indicator

The print quality light indicates three modes of operation:

NLQ – When both the left and right lamps are lit, the printer is in the Near Letter Quality print mode.

Draft – When just the left lamp is lit, it indicates the printer is in the Draft print mode.

Standard – If the right lamp is lit, the unit is in the Standard print mode. This is the default mode when the unit is turned on.

Error

The error light has three ways of indicating an error condition in the printer:

If the error light comes on steady and stays on (and the select light goes off), the printer is out of paper.

If the light blinks in a steady fashion (evenly spaced blinks), either a cover is open or a left-margin error has occurred.

If the light blinks in a repeating sequence of one short blink and a long blink, either an interface communication or a RAM check error has occurred.

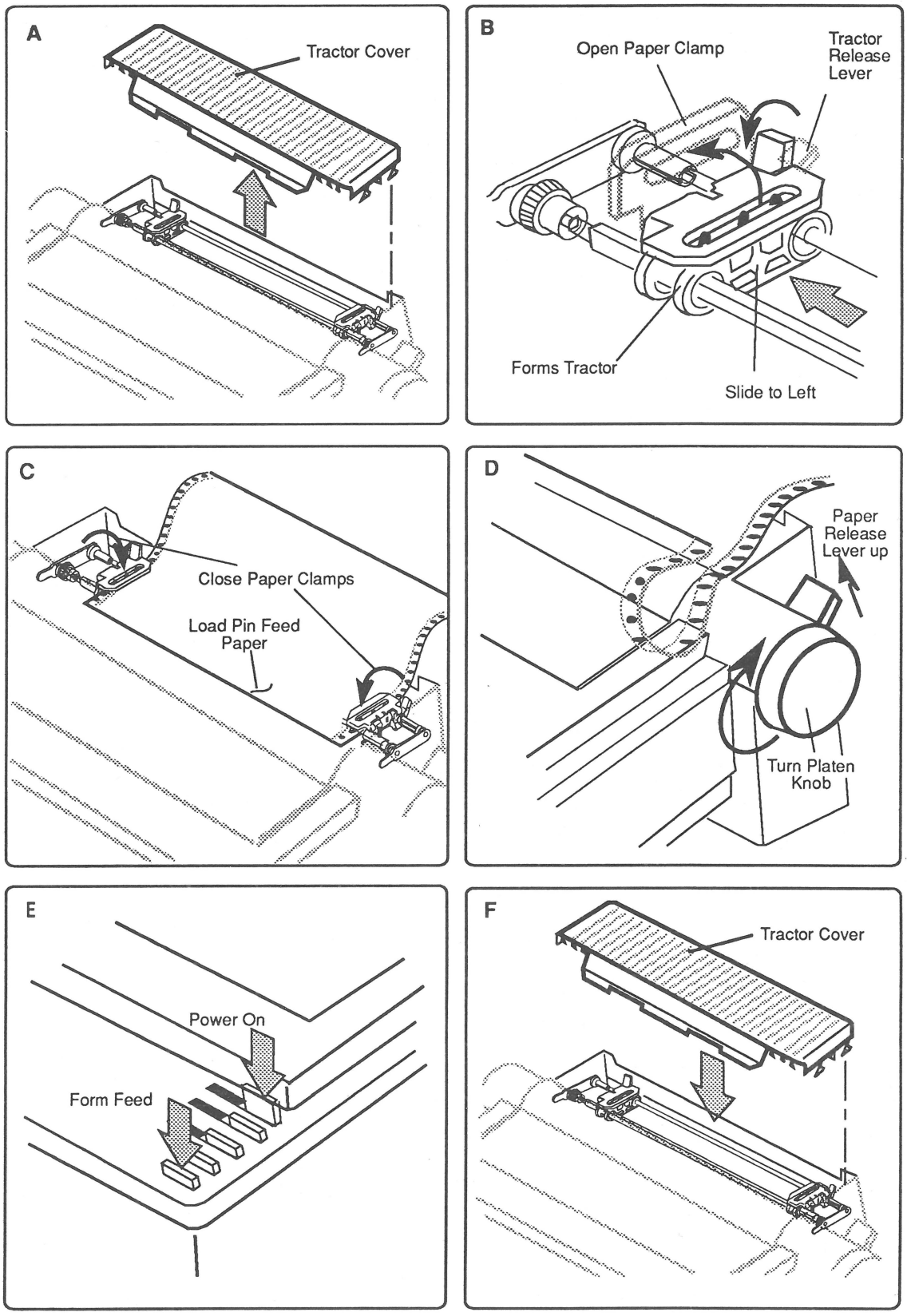

Figure 1-6 Loading Pin-Feed Paper

❑ SETUP

Power On and Off

1. Connect one end of the power cord to the printer and the other end to an electrical outlet.
2. Press the power switch on.
3. Check the switch panel. Make sure the power light comes on.
4. Press the power switch off.

Loading Pin Feed Paper

Refer to **Figure 1-6** as you follow these directions for loading continuous-form pin-feed paper.

1. Make sure the power is off.
2. Lift up and remove the tractor cover **(Figure 1-6A)**.
3. Lift up the paper clamps on both forms tractors **(Figure 1-6B)**.
4. Make sure that the left forms tractor is positioned all the way to the left. (To move the forms tractor, pull the tractor-release lever **[Figure 1-6B]** forward.) Lock the forms tractor in place by pushing back the tractor-release lever.
5. Place the paper over the forms tractor pins **(Figure 1-6C)**. If the paper doesn't line up with the pins, move the right forms tractor until it does. Lock the right forms tractor in place.
6. Push down the paper clamps on both of the forms tractors.
7. Make sure the paper-release lever is pulled up to the pin feed position **(Figure 1-6D)**.

   Note: The paper can now be fed into the platen in two ways: manually or automatically.

   - To manually feed the paper, turn the platen knob until the paper comes through and around the platen and under the paper guide **(Figure 1-6D)**.

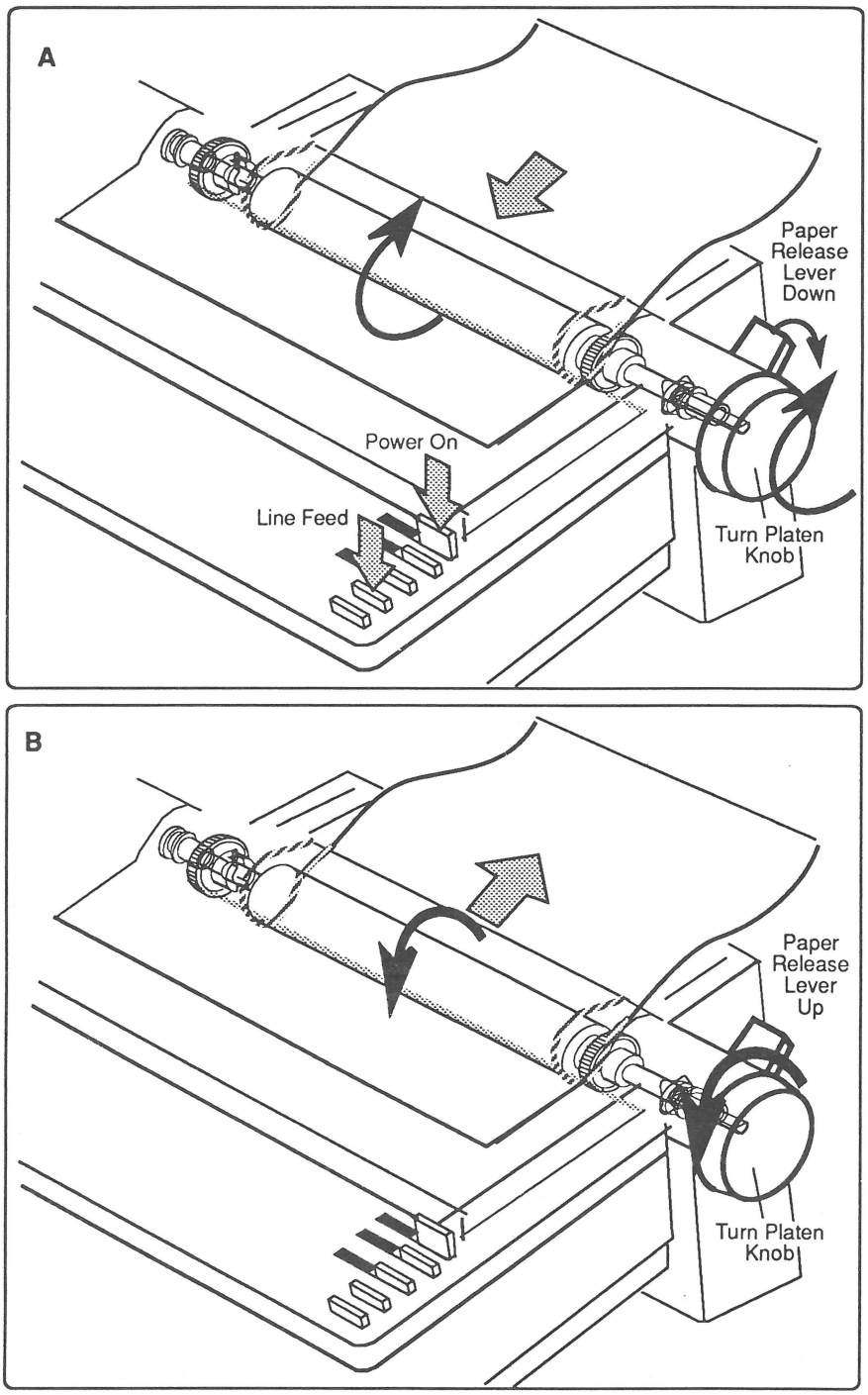

Figure 1-7 Loading Single Sheet Paper

- To use the auto-loading function, turn the power on and press the form feed switch **(Figure 1-6E)**. The printer will load the paper around the platen and stop at the first print line.

8. Replace the tractor cover **(Figure 1-6F)**.

Load Single Sheet Paper

Refer to **Figure 1-7A** for loading a single sheet of paper.

1. Make sure the power is off.
2. Lower the paper release lever.
3. Insert the single sheet into the paper inlet.
4. Turn the power on.
5. Press the form feed switch. This feeds the paper around the platen to the first print line.
6. Turn the platen knob to adjust the paper the way you want it.

Note: If the paper is twisted (the paper is not even across the platen), pull up the release lever and align the paper. Then push the paper release lever down again. Turn the platen knob to adjust the paper for the first print line.

Remove Paper

Refer to **Figure 1-7B** for removing the paper.

1. Make sure the power is off.
2. Check to be sure the paper release lever is set to tractor feed.
3. Turn the platen knob and back the paper out.

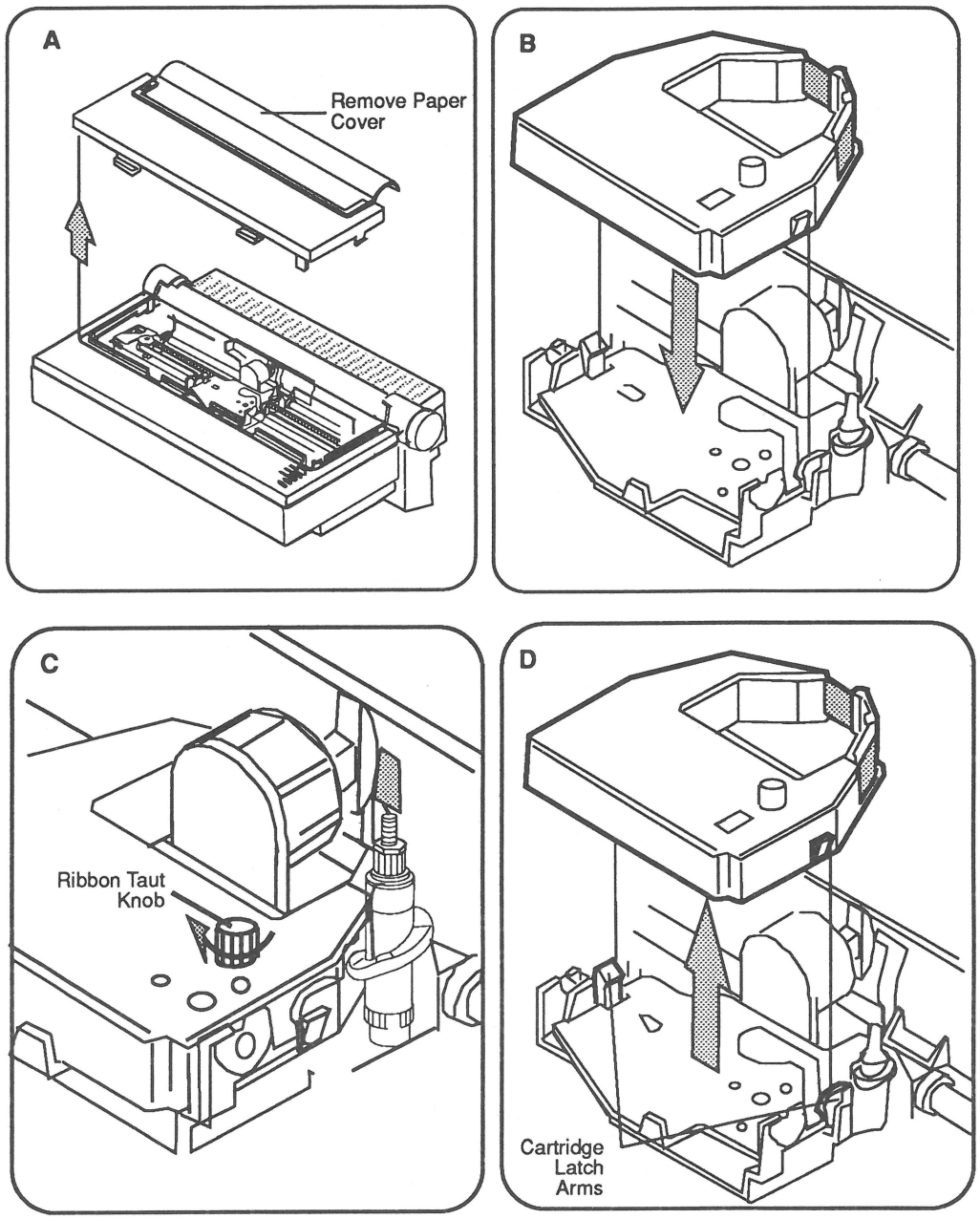

Figure 1-8 Ribbon Cartridge

Ribbon Cartridge

Refer to **Figure 1-8** as you remove or install a ribbon cartridge.

Install

1. Make sure the power is off.
2. Lift up and remove the paper cover **(Figure 1-8A)**.
3. Place the ribbon cartridge on the ribbon plate, and push down on the cartridge until it snaps into place **(Figure 1-8B)**.
4. On the cartridge, turn the knob **(Figure 1-8C** clockwise until you hear it click and the ribbon is taut.
5. Replace the paper cover.

   Note: Be sure to replace the paper cover before attempting to operate the printer. The printer will not print unless the paper cover is in place.

Remove

1. Make sure the power is off.
2. Lift up and remove the paper cover **(Figure 1-8A)**.
3. While pushing out on the cartridge latch arms **(Figure 1-8D)**, lift up the cartridge.

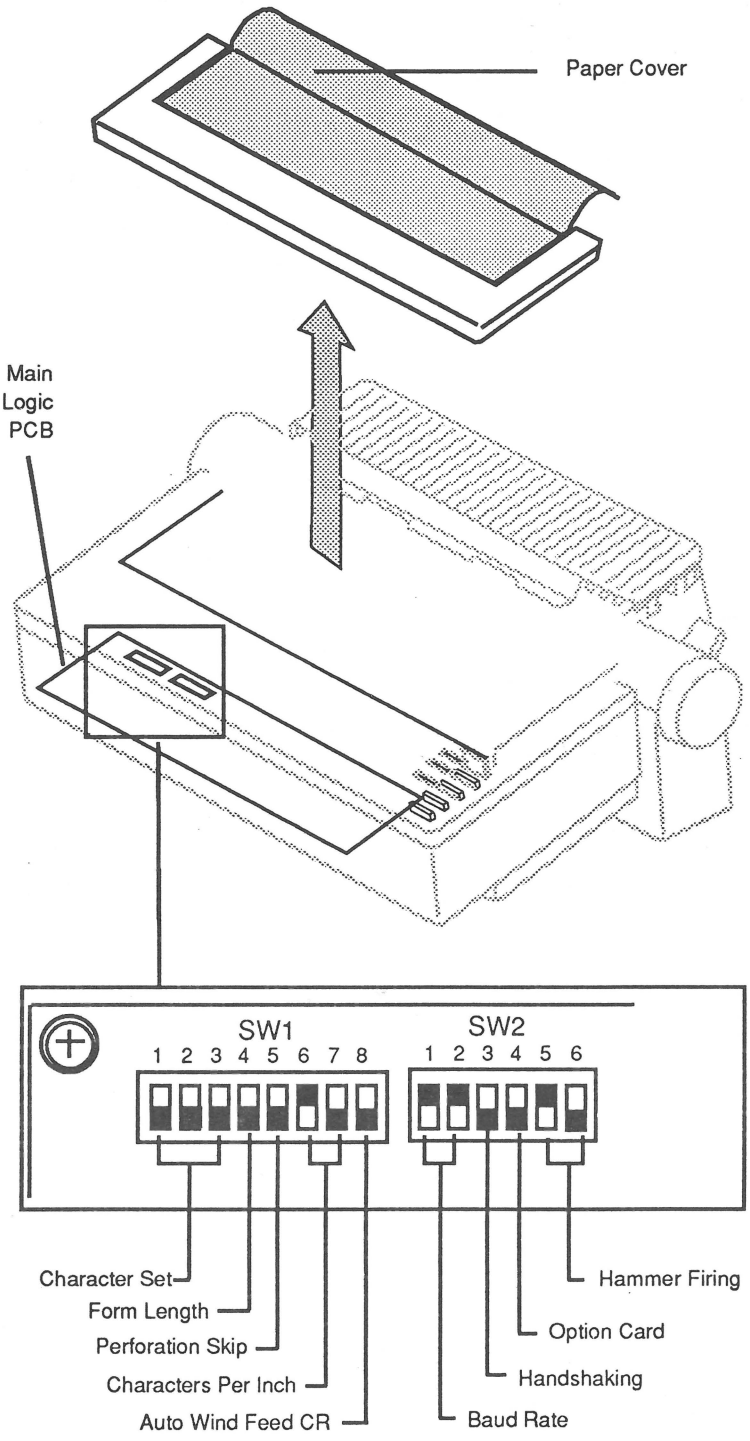

Figure 1-9 DIP Switches

Configuration DIP Switch Settings

Configuration DIP switches provide variations in the way the printer may be operated. To change the switches, you will need a jeweler's flat-blade screwdriver. For additional information on switch settings, refer to the *Peripheral Interface Guide.*

Refer to **Figure 1-9** as you follow these directions for setting the DIP switches.

1. Make sure the power is off.
2. Remove the paper cover.
3. Slide the carrier all the way to the right.
4. Locate switches SW1 and SW2.

   Note: SW2-5 and SW2-6 are used only when performing the firing hammer adjustment (refer to Section 4, Adjustments).

5. Use a small screwdriver to move the switch handles as desired.
6. Replace the paper cover.
7. Run the self-test.

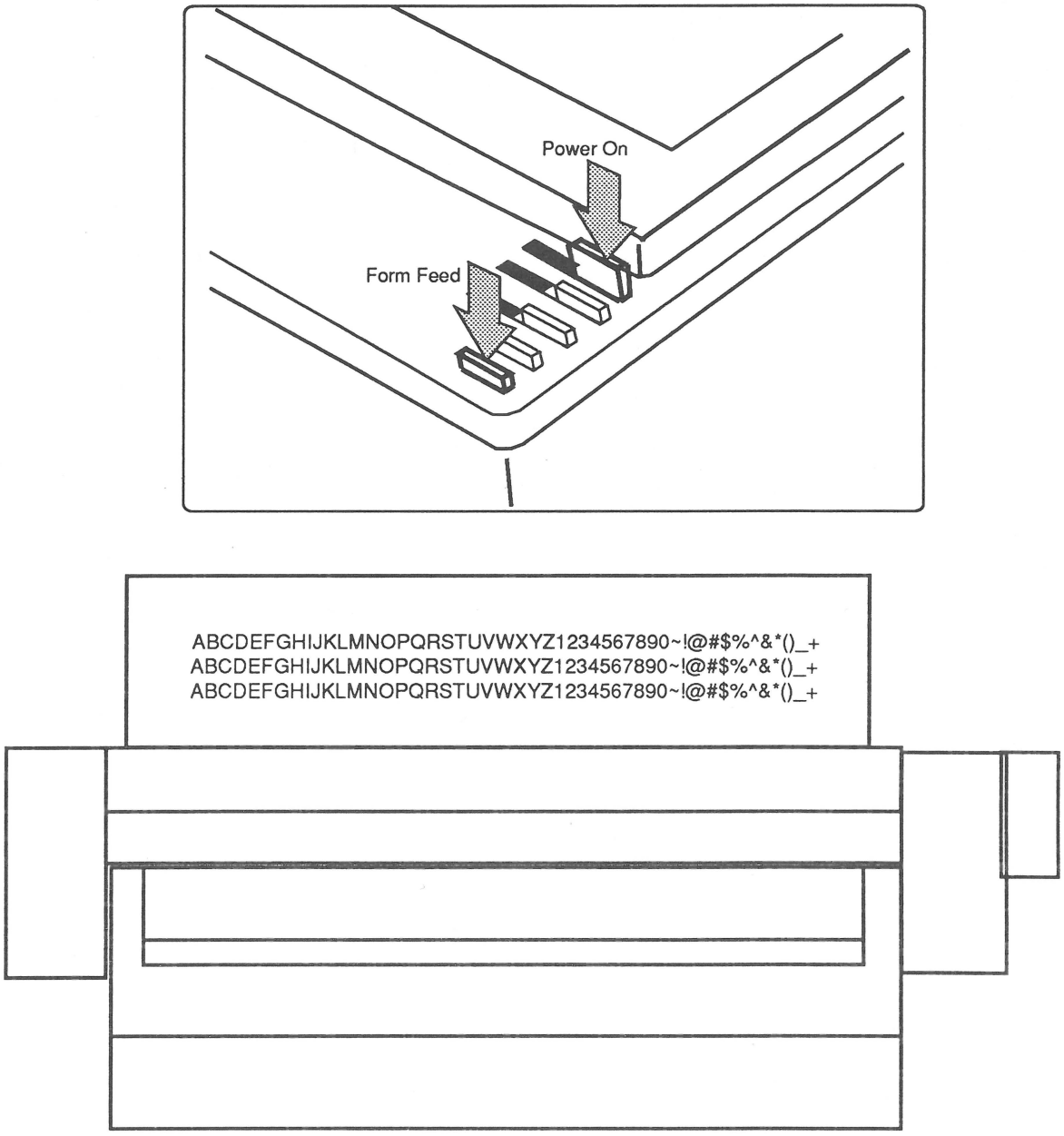

Figure 1-10 Self Test

❑ SELF-TEST

To perform the self test, do the following:

1. Make sure the power is off.

2. Load the paper.

3. Press and hold down the form-feed switch while you turn the power on. Then release both switches **(Figure 1-10)**.

   The first part of the printout shows the ROM revision number, the DIP switch settings, and whether either option card is installed. After that, the printout shows lines of characters. Each line contains the letters of the alphabet, the numbers 0 through 9, and a series of special characters.

   Note: If you are using a colored ribbon, the test printout will alternate the colors of each line printed.

4. To end the test, turn the power off.

   Note: If the select button is accidentally depressed during power-up, the next data that is sent to the ImageWriter will be a hexadecimal dump. If this occurs, power the ImageWriter off and then back on. The printer will power up in the proper mode.

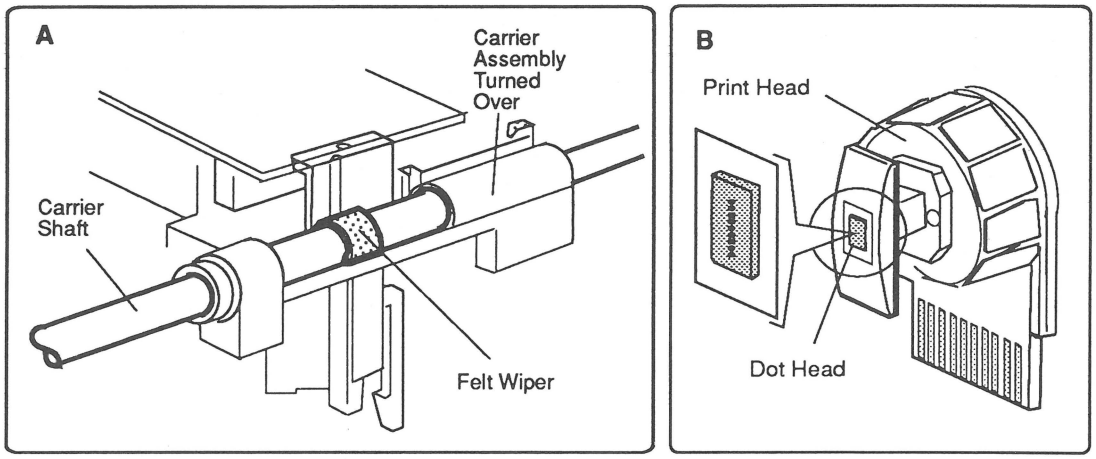

Figure 1-11 Lubricating the Carrier Shaft and Cleaning the Dot Head

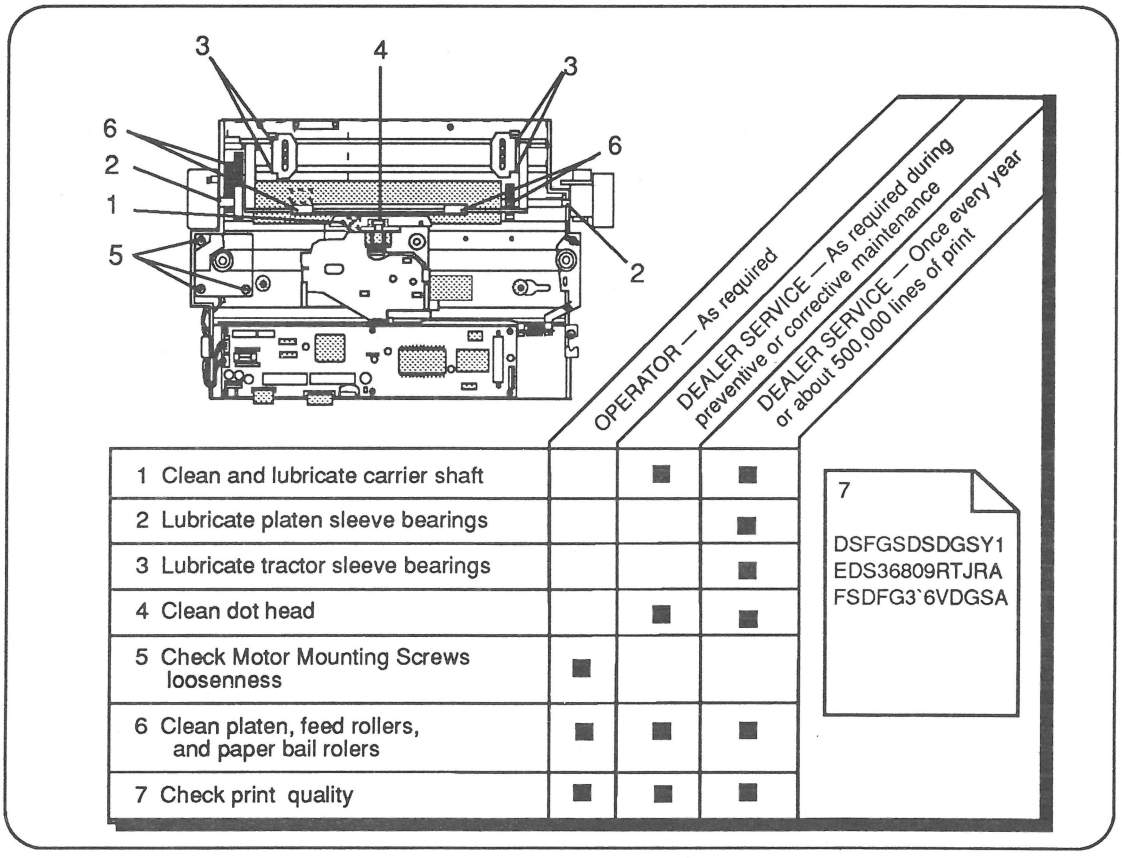

Figure 1-12 Maintenance Schedule

❑ PERIODIC MAINTENANCE

Clean the printer as often as required. Lubricate it once a year, or more often if the printer is used heavily.

Carrier Shaft

1. Make sure the power is off.
2. Remove the tractor cover and the paper cover.
3. Remove the paper and ribbon cartridge.

   Note: For the next two steps, refer to Section 2, Take-Apart, for complete instructions on removing the carrier assembly and carrier shaft.

4. Using gauze or absorbent cotton, wipe the dirt off the carrier shaft.
5. Apply four drops of light lubricating oil to each of the felt wipers, which are located under the carrier assembly **(Figure 1-11A).**

Dot Head

1. Remove the ribbon cartidge.
2. Remove the print head.
3. Clean the dot head **(Figure 1-11B)** with a lint-free cloth and a low-residue cleaner such as isopropyl alcohol or Freon.
4. Replace the ribbon cartridge.
5. Replace the print head.
6. Perform the self-test to verify optimum printing performance.

Maintenance Schedule

Figure 1-12 at left summarizes the manufacturer's recommended maintenance intervals.

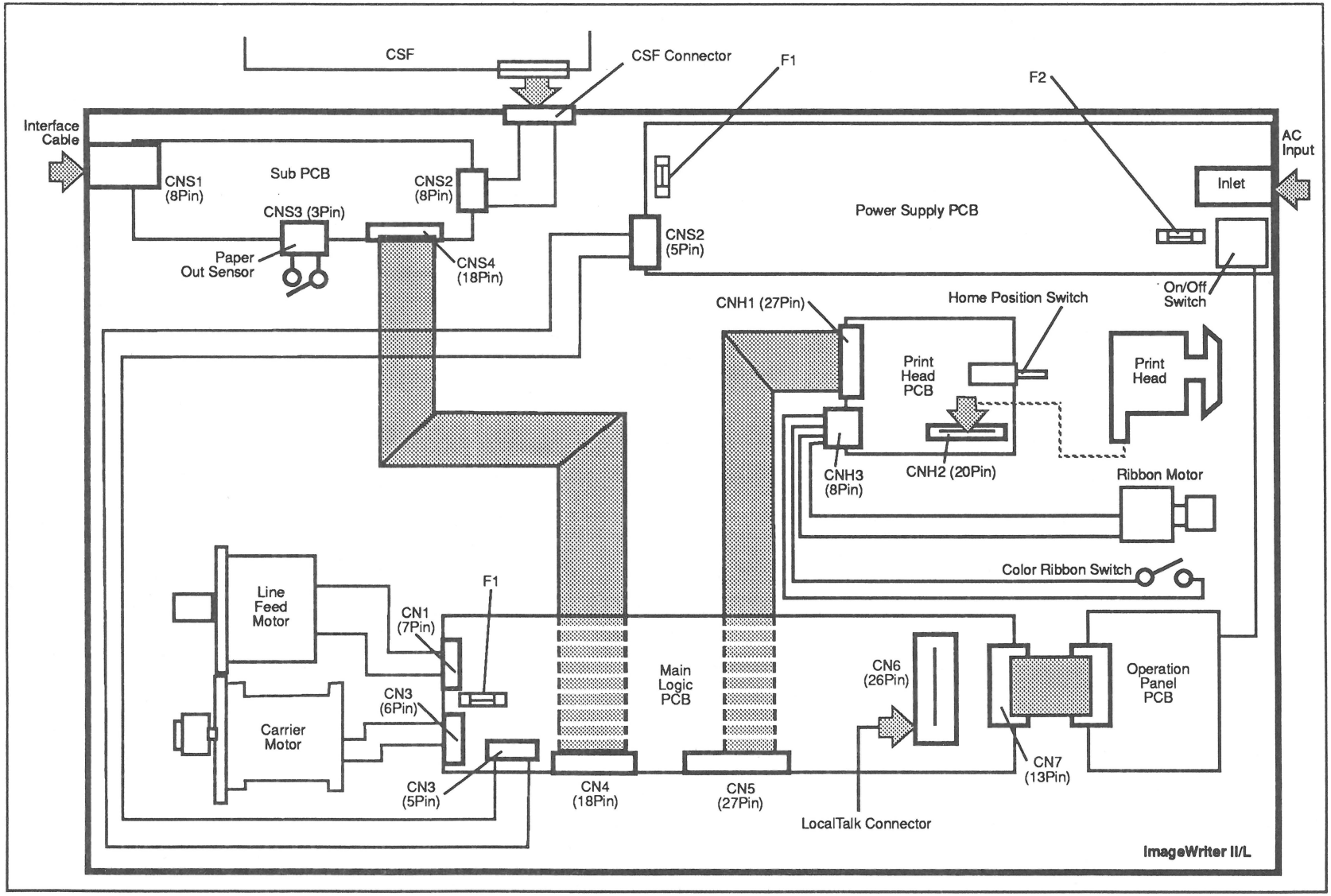

Figure 1-13 Block Diagram

❑ THEORY OF OPERATION

Introduction

Troubleshooting can be approached in different ways; Apple usually recommends both module swapping and logical troubleshooting. But random module swapping is impractical for printers because they have so many parts. So, to troubleshoot the ImageWriter II/L, you will usually want to use the logical troubleshooting method.

Before you begin to troubleshoot the ImageWriter II/L, attempt to run the self-test before you connect the printer to a computer. If the self-test does not run correctly, you can observe where it stops working. Using this observation along with the information given in this section and in the troubleshooting section, you should be able to isolate the problem to the faulty module.

The electrical operation of the printer consists of five printed circuit boards, three motors, and several switches **(Figure 1-13).** The PCBs are the power supply board, main CPU board, sub PCB board, head PCB board, and the operation panel PCB board. The three motors are the carrier motor, line feed motor and the ribbon position motor. As for switches, there is the home position switch, paper-out sensor switch, and ribbon switch.

Power Supply

This model printer has a switching type power supply that eliminates the need for a bulky transformer. When the input AC current is applied to this board, the power supply reduces and rectifies the voltage to the following DC voltages:

+ 5 VDC
- 5 VDC
+26 VDC

The +5 and -5 VDC voltages are for logic; the 26 VDC is for motor drive. All the voltages are fed from connector CN5 on the power supply board to connector CN3 on the main logic board. From the main logic board the voltages are distributed to the other boards and motors. The power supply has two fuses to help protect the electronics—FU1 is a 120V 2-amp fuse and FU2 is a 125V 4-amp fuse.

Note: Although not on the power supply board, there is another fuse, FU1 located on the main logic board that protects the +26 motor voltage.

The on/off power switch is connected to the power supply board and disconnects or connects the main AC current to the board. The switch is comprised of a cable type plunger that is attached to the power supply board. When the cable is depressed it activates the plunger mounted on the power supply board.

***CAUTION:** This power supply is not compatible with the older ImageWriter II. Do no attempt to switch the power supplies between models.*

Main Logic Board

The main logic board is the heart of the printer. Besides handling the distribution of the voltages, it also handles all the logic that controls the printer. It is also the source of the drive signals for the print head. All sensor signals that affect the operation of the printer are fed to this board.

The main logic board has the following circuity on it:

ROM – The ROM (IC10) chip has the start-up routines and several features such as character sets and self-test routines built in.

RAM – The RAM (IC9) is used in the transfer of data and acts as a buffer. When printing starts, the data to be printed is transferred from the host CPU to the RAM on the printer. From the RAM the data is passed through the logic and sent to the print head to print. Turning off the printer clears the RAM.

Interface Circuits – The interface circuits (IC2 and IC3) on the main CPU board handle the data transferred from the host CPU via the sub PCB board. These circuits also handle the status and control lines from the printer to the host CPU.

CPU and Gate Array – The CPU (IC8) along with the gate array (IC4), handles the logic and decision-making of the printer. They combine to evaluate the status of all the printer and issue commands concerning when to transfer data, when to start printing, when to stop printing, when to run the motors, and what actually prints. In other words, all the functions of the printer are controlled by these two devices. The rest of the circuits are supporting circuits.

Print Head Drivers - These drivers (IC5 and IC6), process the print head drive signals from the CPU and gate array. The signals are sent to the print head PCB via CN5.

Carrier Motor Drivers – The carrier motor circuit is made up of transistors Q1, Q2, Q12, Q13 and IC1. The transistors make up a circuit that is used as common returns from the motor. The transistors also supply the higher voltage and current needed to drive the motor. IC1 is a transistor pack that completes the drive signal circuit when turned on. Each of the four signals drive a phase of the motor. These drive signals go to the carrier motor on the printer via CN2.

Line Feed – The drive circuit is made up of transistors Q8, Q9, Q10, and Q11. The four drive signals from the gate array are processed in this circuit. This is where the higher voltage and current is added to the phase control signals to turn on the line feed motor. The signals are then sent to the line feed motor and ribbon motor via CN1.

Ribbon Motor Drivers – This circuit is made up of transistors Q3, Q4, Q5, Q6, and Q7. Basically, this circuit works the same as the carrier and line feed motor control circuits. When turned on, the line feed motor signals from the gate array are supplied with more current in the drive circuit and sent out to the motor. The common return line is on Q7, which is turned on for each phase signal sent to the motor. These signals are sent via CN5.

Reset Circuit – This circuit is used when the printer is turned on to keep the logic in a reset state until the voltages are up to correct values. Once the voltages are at the correct level, reset is released and the logic is allowed to start functioning from a known state.

Connector CN6 – This connector is an LocalTalk option card connector. This card allows the printer to communicate on the LocalTalk network so that multiple users can use the printer.

Clock Cystals – There are two clock cystals on the main logic board. X1, the clock for the gate array IC4 runs at 17.2 MHz. X2, the clock for the CPU, runs at 12 MHz.

DIP Switches – The configuation DIP switches are mounted on the main logic board and can be changed to make the printer perform in different modes, or control printer protocols. The switch settings affect both the CPU and the gate array logic.

Sub PCB

The sub PCB board acts as an interface board. The interface cable from the host CPU is plugged into the connector CNS1 on this board. The signals from the host CPU pass through this board on their way to the main CPU board. If a cut-sheet feeder is attached to the printer, the signals pass through this board via CNS2, which controls the actions of the feeder.

The paper-out sensor wires (located under the paper carriage) go to this board via CNS3 and are passed along to the main CPU board.

All the signals coming or going to this sub PCB board are sent through CNS4 and the ribbon cable to the main CPU board at connector CN4.

Head PCB

The head PCB board, located underneath the carriage assembly, receives the print head drive signals from the main CPU board via CNH1. The signals are then sent out on connector CNH2 to the print head. This board also handles the ribbon motor drive signals and the ribbon switch signals. If the switch is activated, a color ribbon is detected. This information is sent to the main CPU, which in turn sends controlling signals to the ribbon motor to control the position of the ribbon, thus allowing color printing.

The home position switch is also mounted on this board. Pressing the home position switch alerts the CPU that the carriage is at the far left side of the printer (home position).

Operation Panel PCB

This small circuit board, located on the top cover has the switches (select, print quality, line feed, and form feed) and indicators (error, power, print quality, and select) mounted on it. It interfaces with the main CPU board via CN7 on the main CPU board. While the power switch button is located on the operation panel, it is not connected to the operation panel PCB. The switch button just passes through to the switch mounted on the main frame underneath the operation panel.

Apple Technical Procedures

ImageWriter II/L

Section 2 – Take-Apart

❑ CONTENTS

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2.3 About this Section
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2.15 Print Head and Paper Guide
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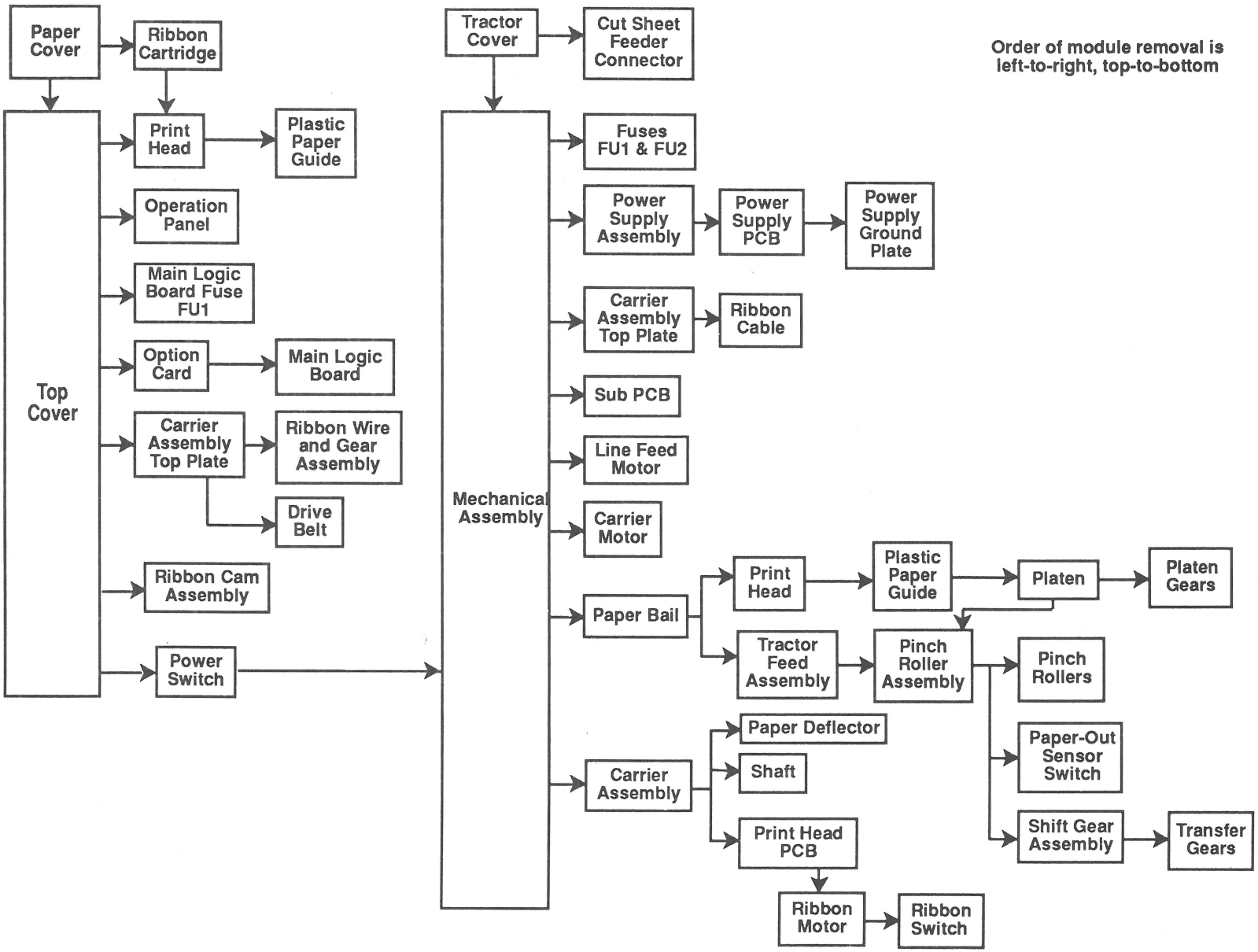
2.69 Print Head PCB
2.71 Ribbon Motor and Color Ribbon Detect Switch

WARNING: *For all procedures, the printer should be off and the AC power cord should be disconnected.*

ImageWriter II/L Take-Apart Flowchart



❑ INTRODUCTION

About this Section

The flowchart on the left is set up with a left-to-right, top-to-bottom flow. The chart is designed so that you can see quickly what modules have to be removed before you get to the module you want. There are two main divisions to the flowchart. First are modules that can be replaced without having to remove the mechanical assembly. For most of these modules you will still have to remove the top cover first, but otherwise you can get at them without much trouble. The second main division is modules that can be removed only after the mechanical assembly has been taken out of the bottom case.

Anytime you see steps in the procedures underlined, it means that these steps have been presented previous to the module you are working on. You will have to refer back to remove those modules first.

We have listed all the materials required below instead of listing them under each module heading. This list will give you an idea of what tools you should have available to you, regardless of what particular module you are working on.

The graphics are designed to give you maximum assistance. When you look at the graphics, pay attention to details, directions, and arrows. Hopefully, just looking at the graphics will be enough to assist you in taking a module apart. If not, the text is there to help you.

Materials Required

Magnetized, #2 Phillips screwdriver
Small Phillips screwdriver
Small pair of curved needlenose pliers
Small needlenose pliers
#3 jeweler's flathead screwdrivers
1/8-inch flathead screwdriver
Fuse puller
Digital multimeter
Pin punch (1/16 inch)

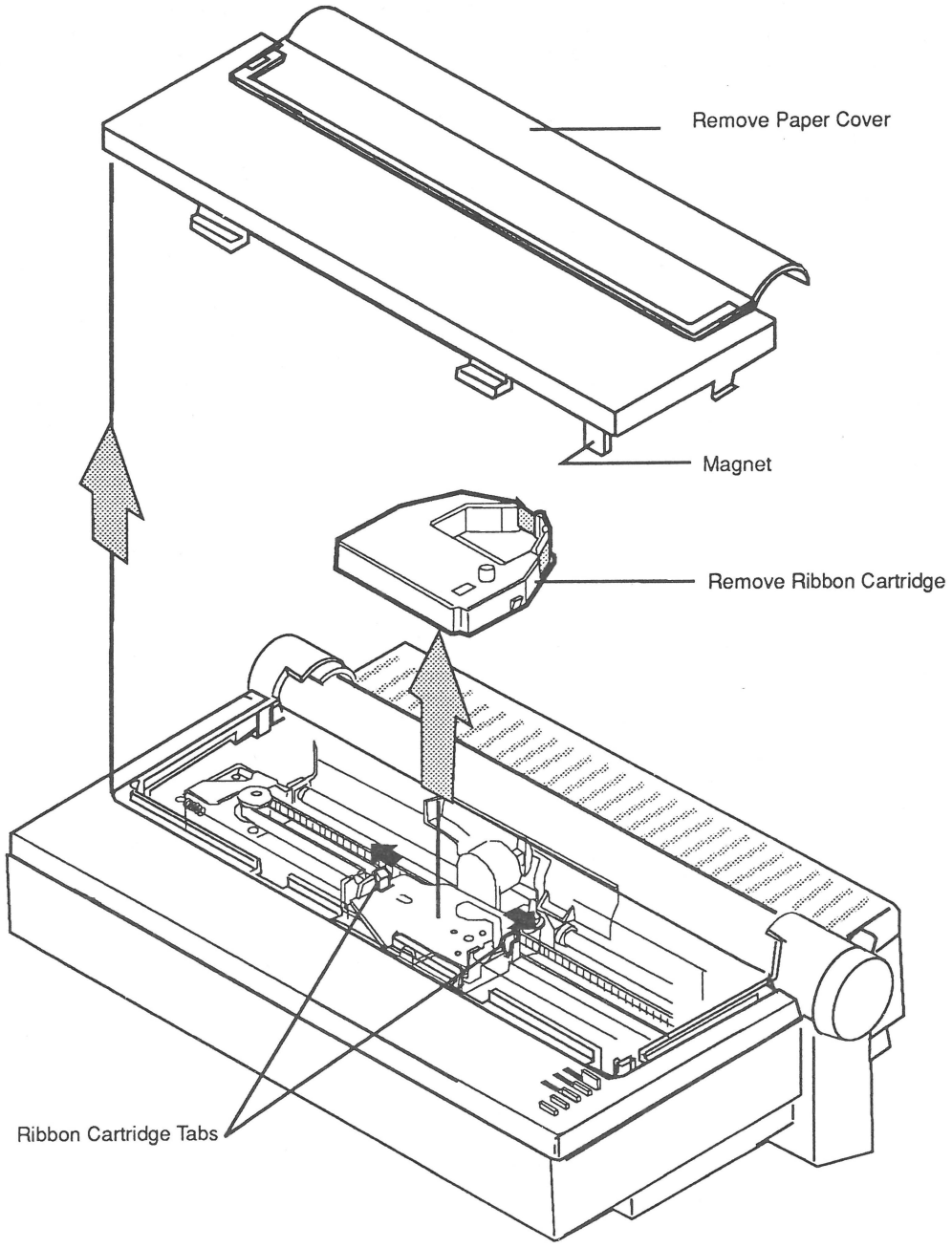


Figure 2-1 Paper Cover and Ribbon Cartridge

❑ PAPER COVER AND RIBBON CARTRIDGE

Paper Cover

The paper cover is made up of two parts: a clear plastic piece that allows you to see the paper travel and an opaque piece that makes up the rest of the unit. The two are removed together as one unit.

Remove

To remove the paper cover, gently pull up on the clear plastic part of the cover **(Figure 2-1)**.

Replace

To replace the paper cover, align the front edge of the cover with the front edge of the bottom case and press the cover into place.

Note: The paper cover has to be in place for the printer to work. There is a magnet located on the paper cover that actuates a reed relay on the operation panel. The relay completes the on-line circuit. If the magnet is not in place, the printer is in an off-line mode and will not print.

Ribbon Cartridge

The ribbon cartridge contains the fabric ribbon, which has the ink for printing. The ribbon cartridge is located on top of the carriage assembly.

Remove

To remove the ribbon cartridge, gently pull the tabs **(Figure 2-1)** apart and lift the cartridge out.

Replace

1. Place the cartridge over the carrier and push down until the cartridge snaps into place. Make sure that the ribbon goes between the print head and the plastic paper guide.
2. Turn the knob on the cartridge clockwise until the ribbon is tight.
3. Replace the paper cover.
4. Perform the self-test.

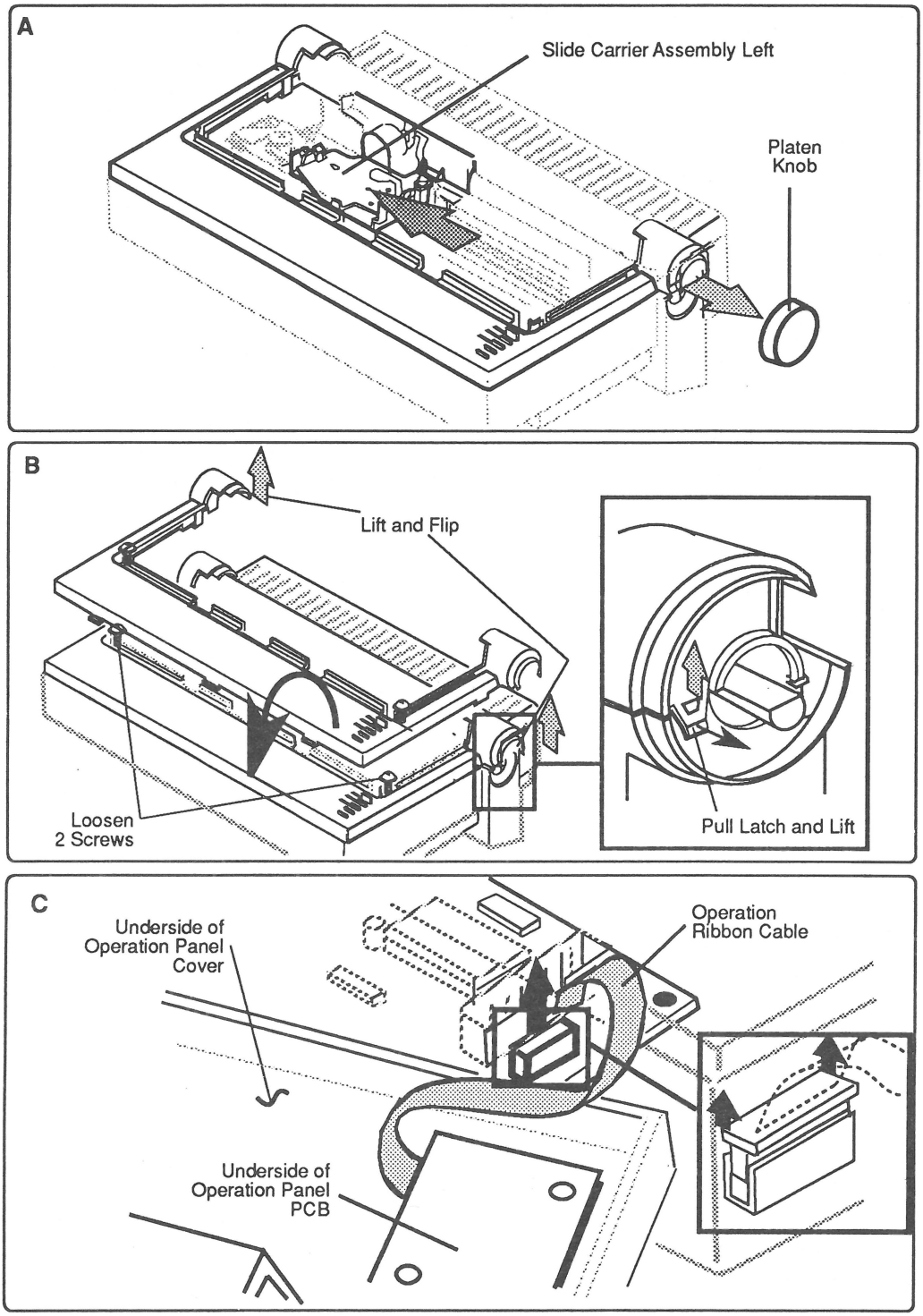


Figure 2-2 Top Cover

❑ TOP COVER

The top cover covers the front top of the printer along with an extension on each side that covers the top half of the legs. The top cover also houses the operation panel, which is mounted on the bottom right-hand side.

Remove

To remove the top cover, refer to the sequence in **Figure 2-2** and follow these steps:

1. Remove the paper cover and ribbon cartridge.
2. Push the carrier assembly to the far left **(Figure 2-2A)**.
3. Pull off the platen knob **(Figure 2-2A)**.
4. Loosen the two screws shown in **Figure 2-2B** as far as they will go.
5. Grasp the top cover on the left at the part that goes over the leg **(Figure 2-2B)**; on the right side pull on the latch, and lift the cover off about one inch.
6. Gently rotate the cover towards the front and turn the cover over to expose the ribbon cable that extends from the operation panel on the top cover to the main logic board **(Figure 2-2C)**.
7. Using your thumb and forefinger, lift up on edges of connector CN7 (on the main logic board) to unlock it, and remove the ribbon cable.
8. Lift off the top cover.

Replace

To replace the top cover, refer to **Figure 2-2** and follow these steps:

1. Push the carrier assembly to the left **(Figure 2-2A)**.
2. Lay the cover in place and lift the right side. Lift up on the edges of connector CN7 to unlock it and plug in the ribbon cable from the operation panel **(Figure 2-2C)**. Push down on the connector to lock the ribbon in.

3. Tilt the cover toward you till the front edge is in place.

4. Push down on the cover. On the right side, make sure that the latch **(detail in Figure 2-2B)** snaps into place.

5. Tighten the two screws shown in **Figure 2-2B**.

6. Replace the ribbon cartridge and the paper cover.

7. Perform the self-test.

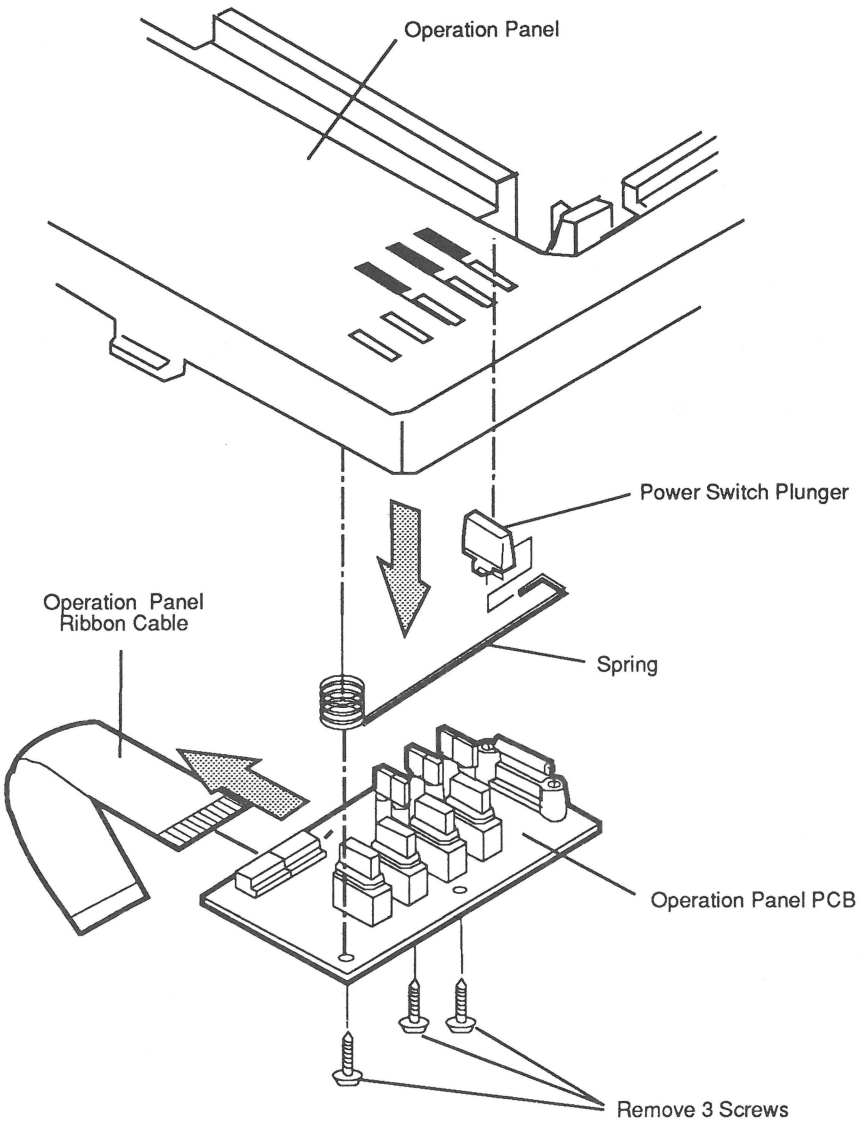


Figure 2-3 Operation Panel

❑ OPERATION PANEL

The operation panel is mounted on the underside of the top cover. This panel, made up of a PCB board, switches, and indicator LEDs, is what the operator uses to control the printer and to find out the status of the printer.

Refer to **Figure 2-3** when removing and replacing the operation panel.

Remove

1. Remove the paper cover.
2. Remove the top cover.
3. Lay the top cover upside down on a flat surface.
4. Remove the three screws holding the operation panel in place.
5. Lift the operation panel PCB from the top cover.
6. Unplug the cable from the operation panel PCB.
7. Remove the spring and power switch plunger, which are used to activate the power switch, from the top cover.

Replace

1. Place the top cover upside down.
2. Connect the power button and spring by placing the coiled half of the spring over the outer-corner screw mount and over the button in the top opening on the cover.
3. Plug the cable into the operation panel connector.
4. Line up the screw mounts in the top cover with the holes on the PCB panel (switch side down).
5. Replace the three screws.
6. Replace the top cover.
7. Replace the paper cover.
8. Perform the self-test.

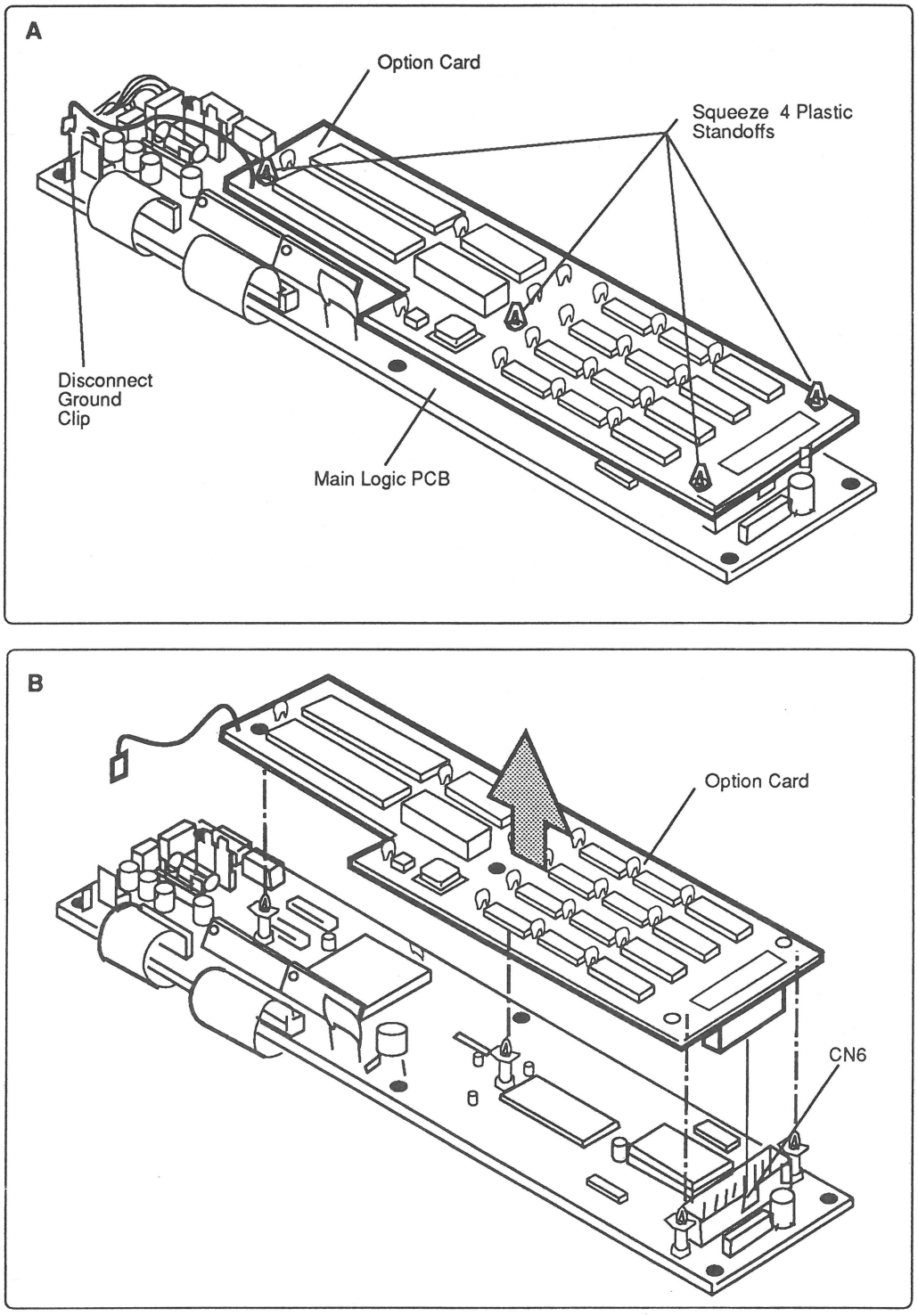


Figure 2-4 Option Card

❑ OPTION CARD

If installed, the option card (LocalTalk interface board) is located on top of the main logic board, which is under the top cover near the front of the printer. The option card is mounted with plastic standoffs and plugs into connector CN6 on the main logic board.

Remove

1. Remove the paper cover.
2. Remove the top cover.
3. Remove the ground clip **(Figure 2-4A)** from the lower-left corner of the main logic board.
4. Using needlenose pliers, squeeze the four plastic standoffs one at a time and gently lift the corners of the option card.

CAUTION: *Make sure you are careful when removing the option card so that the main logic board is not damaged.*

5. Lift out the option card **(Figure 2-4B)**, disconnecting it from connector CN6 on the main logic board.

Replace

1. Position the option card above the plastic standoffs, and line up the connector on the option board with CN6 on the main logic board.
2. Push the option card down. It will snap into place.
3. Replace the top cover.
4. Replace the paper cover.
5. Perform the self-test.

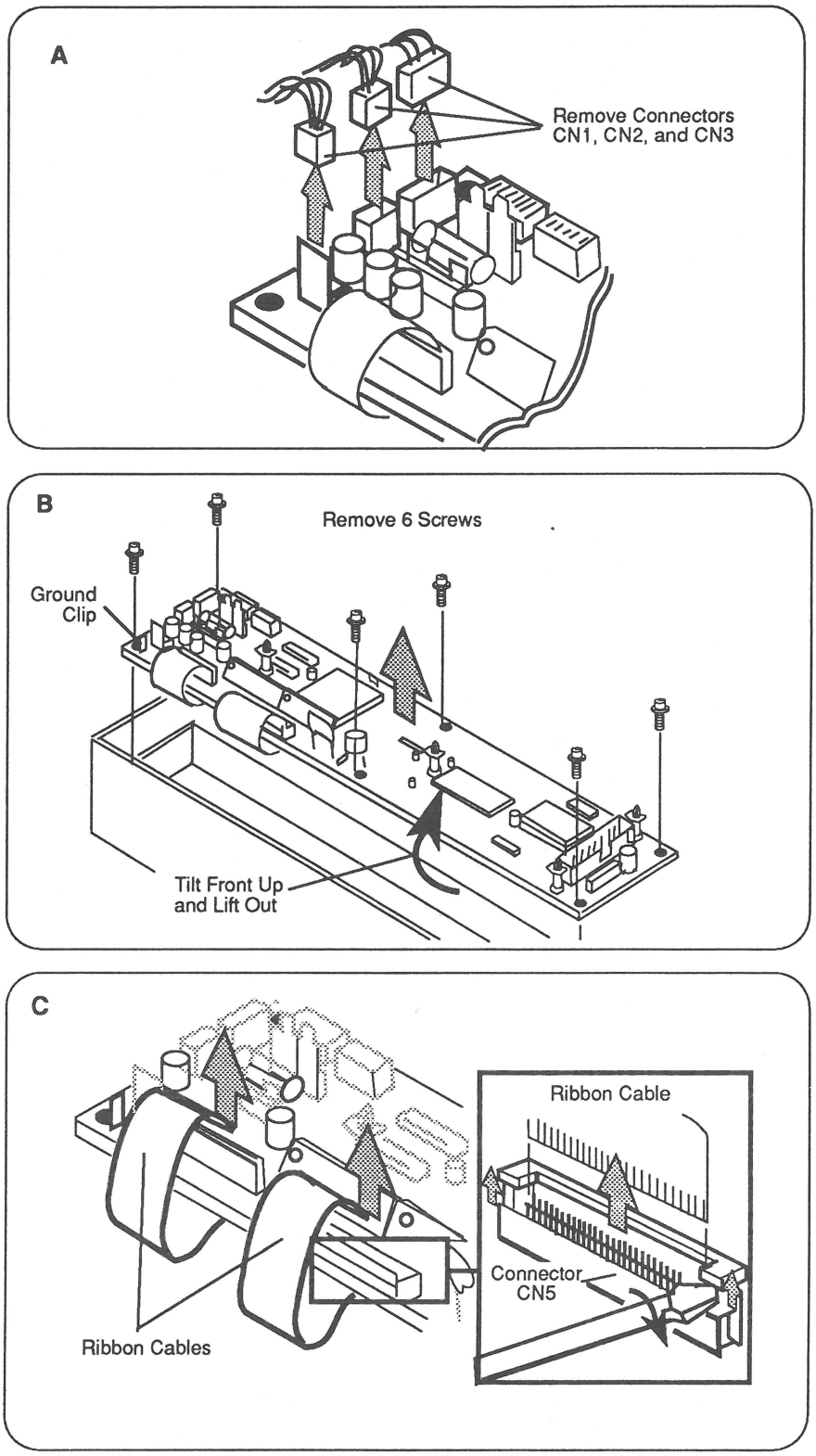


Figure 2-5 Main Logic Board

❑ MAIN LOGIC BOARD

The main logic board is located in the front of the printer, under the top cover. It is the PCB that has all the controlling logic on it.

Remove

1. Remove the paper cover and the top cover.
2. Remove the option card, if one is installed.
3. Disconnect connectors CN1, CN2, and CN3 **(Figure 2-5A)** on the left side of the logic board.
4. Remove the six screws shown in **Figure 2-5B**.
5. Tilt the front half of the board up and gently start lifting the board out. Lifting the front edge first allows the board to clear the carrier assembly. Do not lift the board completely out because two ribbon cables are still attached.
6. Remove the two ribbon cables **(Figure 2-5C)** from connectors CN4 and CN5. Use a small screwdriver to release each side of the connectors.

CAUTION: *Do not just pull the cable out; make sure you release both sides of the connector before pulling the cable.*

Replace

1. Connect the two ribbon cables **(Figure 2-5C)** to connectors CN4 and CN5 on the main logic board.
2. Tilt the front half of the board up. Lower the board onto the screw mounts.
3. Install the six screws shown in **Figure 2-5B**. Make sure that the ground clip is replaced on the screw at the lower left location on the board.
4. Plug in the three connectors **(Figure 2-5A)** on the left side of the board.
5. Install the option card, if one had been installed.
6. Replace the top cover and the paper cover.
7. Perform the self-test.

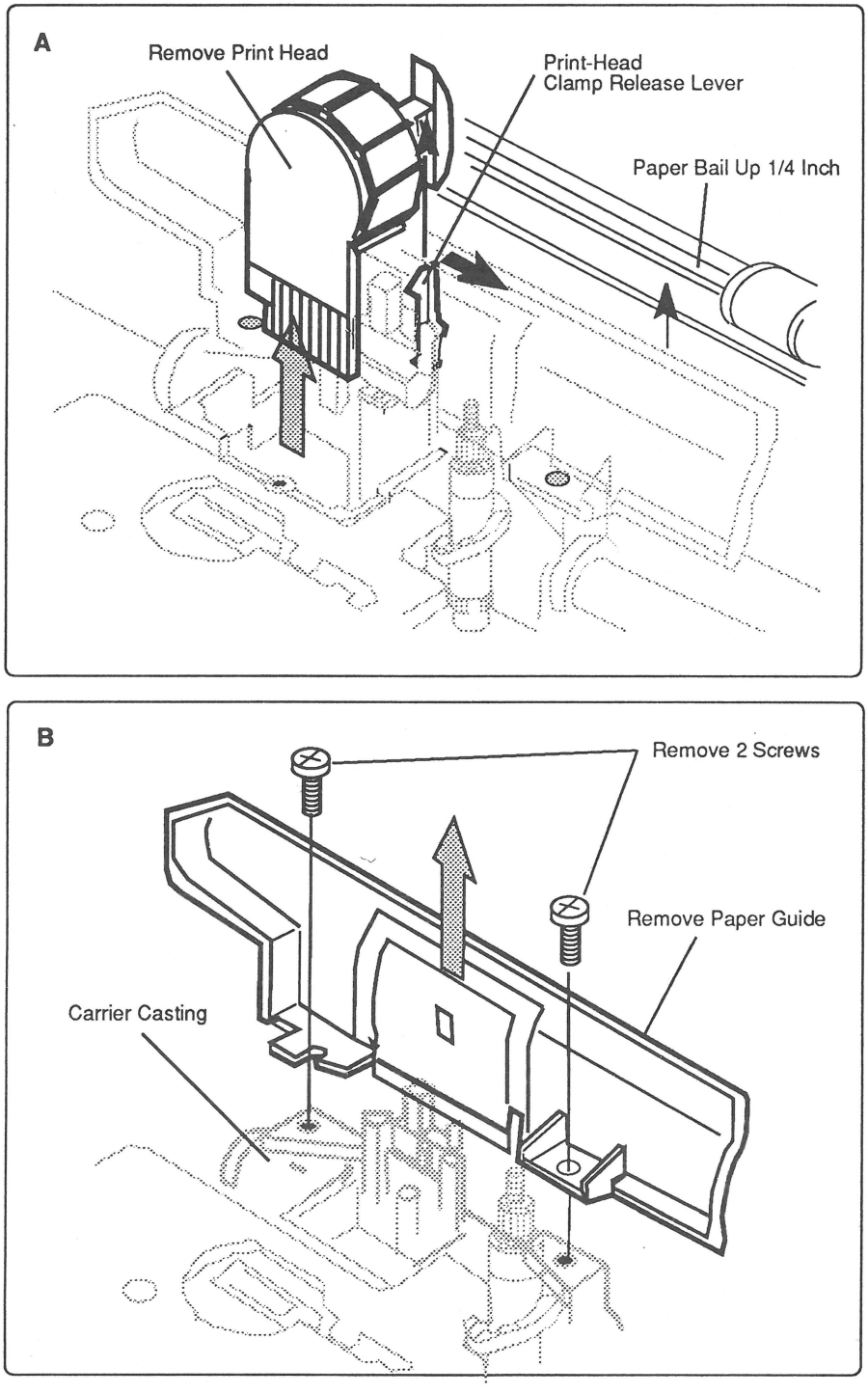


Figure 2-6 Print Head and Paper Guide

❑ PRINT HEAD AND PAPER GUIDE

Print Head

The print head is located on the carrier assembly. It contains the print wires that do the actual printing.

Remove

1. Remove the paper cover and ribbon cartridge.
2. Lift the paper bail up to its highest position **(Figure 2-6A)**.
3. Set the paper thickness lever to its widest setting.
4. Gently push and hold aside the white print head clamp release lever **(Figure 2-6A)**. Grasp the print head and slowly lift it straight up and out of the connector.

Replace

1. Line up the metal connector "fingers" of the print head with the connector **(Figure 2-6A)**.
2. Align the print head so that the front oblong portion goes between the paper guide covering the platen and the print-head clamp **(Figure 2-6A)**. The print-head clamp goes over the indentations on the print head.
3. Gently push the print head down until it is firmly seated and the white clamp is snapped in place.
4. Replace the paper cover and ribbon cartridge.
5. Perform the self-test.

Paper Guide

The paper guide is the piece of clear plastic that sits between the print head and the platen.

Remove

1. Remove the print head.
2. Remove the two screws that hold the paper guide to the carrier frame **(Figure 2-6B)**.
3. Lift out the paper guide.

Replace

1. Put the paper guide in place and align the two screws holes with the holes on the carrier frame.
2. Secure the two screws.
3. See Section 4, Adjustments, to adjust the paper guide correctly.
4. Replace the print head.

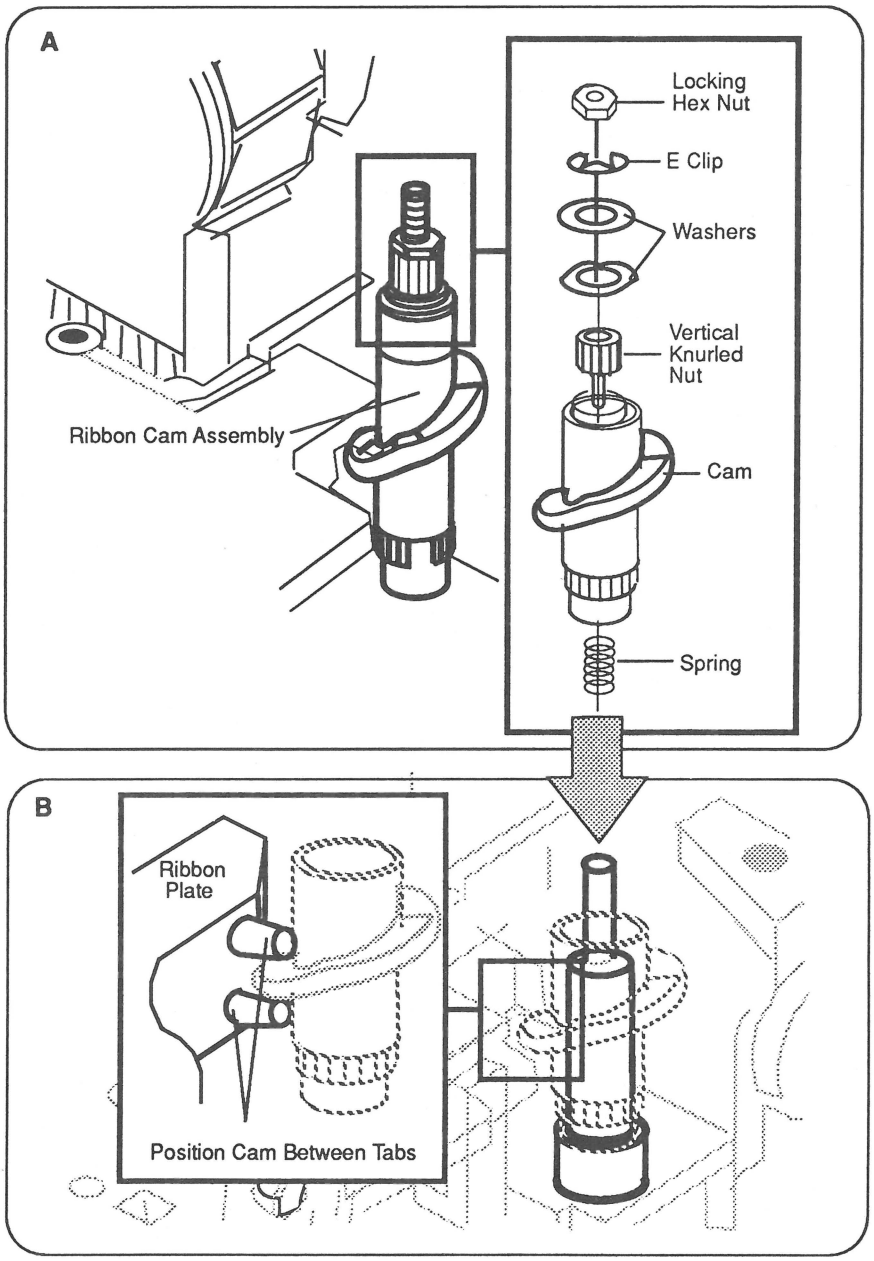


Figure 2-7 Ribbon Cam Assembly

❑ RIBBON CAM ASSEMBLY

The ribbon cam assembly is located on the right front of the carrier assembly. Its function is to raise and lower the ribbon cartridge when a color ribbon is installed.

Remove

1. Remove the top cover.
2. Refer to **Figure 2-7A** while you remove the following items in the sequence listed:
   a) Locking hex nut
   b) "E" clip
   c) Washers
   d) Vertical knurled nut
3. Lift off the ribbon cam, turning it until it is free from the ribbon plate.
4. Remove the spring.

Replace

1. Replace the spring.
2. Slide on the ribbon cam so that the ridge on the cam is between the two tabs on the ribbon plate **(Figure 2-7B)**. Improper positioning of the cam can cause poor-quality printing or no printout.

CAUTION: *Verify that the two tabs are riding on the ridge. Improper positioning of the cam can cause poor-quality printing or no printout.*

3. Replace and screw down the knurled nut.
4. Replace the washers.
5. Replace the "E" clip.
6. Replace the locking hex nut.
7. Perform the color printing adjustment. Refer to Section 4, Adjustments.
8. Replace the top cover.

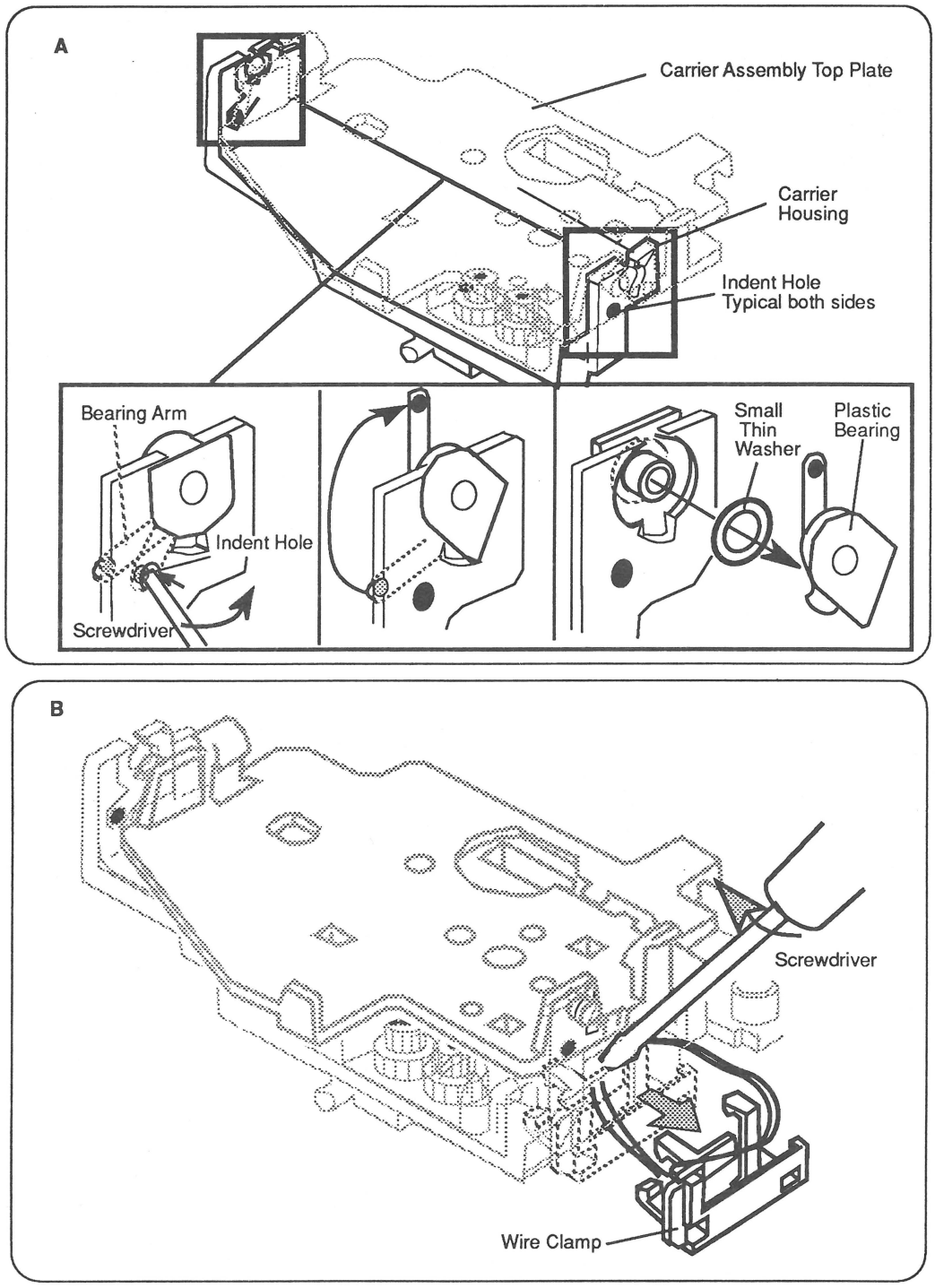


Figure 2-8 Carrier Assembly Top Plate

❑ CARRIER ASSEMBLY TOP PLATE

The carrier assembly top plate covers the carrier housing, ribbon gear drive assembly, and drive belt connection. It meshes with the ribbon cam assembly and moves up and down when the cam assembly is moving. It houses the color ribbon detect switch and the ribbon cartridge.

Remove

1. Remove the paper cover and the ribbon cartridge.

2. Remove the top cover.

3. Locate the indent holes on the sides of the carrier assembly **(Figure 2-8A)**.

4. Gently insert a jeweler's flathead screwdriver into the hole. The black bearing arm will come out. With another jeweler's flathead screwdriver, gently pry the arm upward **(Figure 2-8A)** at a slight angle.

   Helpful Hint: In order to see the arm better, tilt the top plate forward by pressing down on the back end of the top plate. The top plate will rock forward and expose the arm.

IMPORTANT: *Do not use force when removing the black plastic arms or you will break them.*

5. Move the small arm to the top. Gently pull the plastic bearing straight out **(Figure 2-8A)**. Remove the small washer.

6. Repeat steps 3 through 5 for the right side. **The bearings are not interchangeable.**

7. Remove the color ribbon detect switch wires from the plastic clamp **(Figure 2-8B)** by gently prying the wire clamp (from the top side) away from the carrier assembly.

   Note: If you are replacing just the top plate, perform steps 8 through 12 to remove the color ribbon detect switch. If you are not replacing the top plate but are trying to get to the gear assembly or to the drive belt, go to the appropriate section for removing the gear assembly or the drive belt.

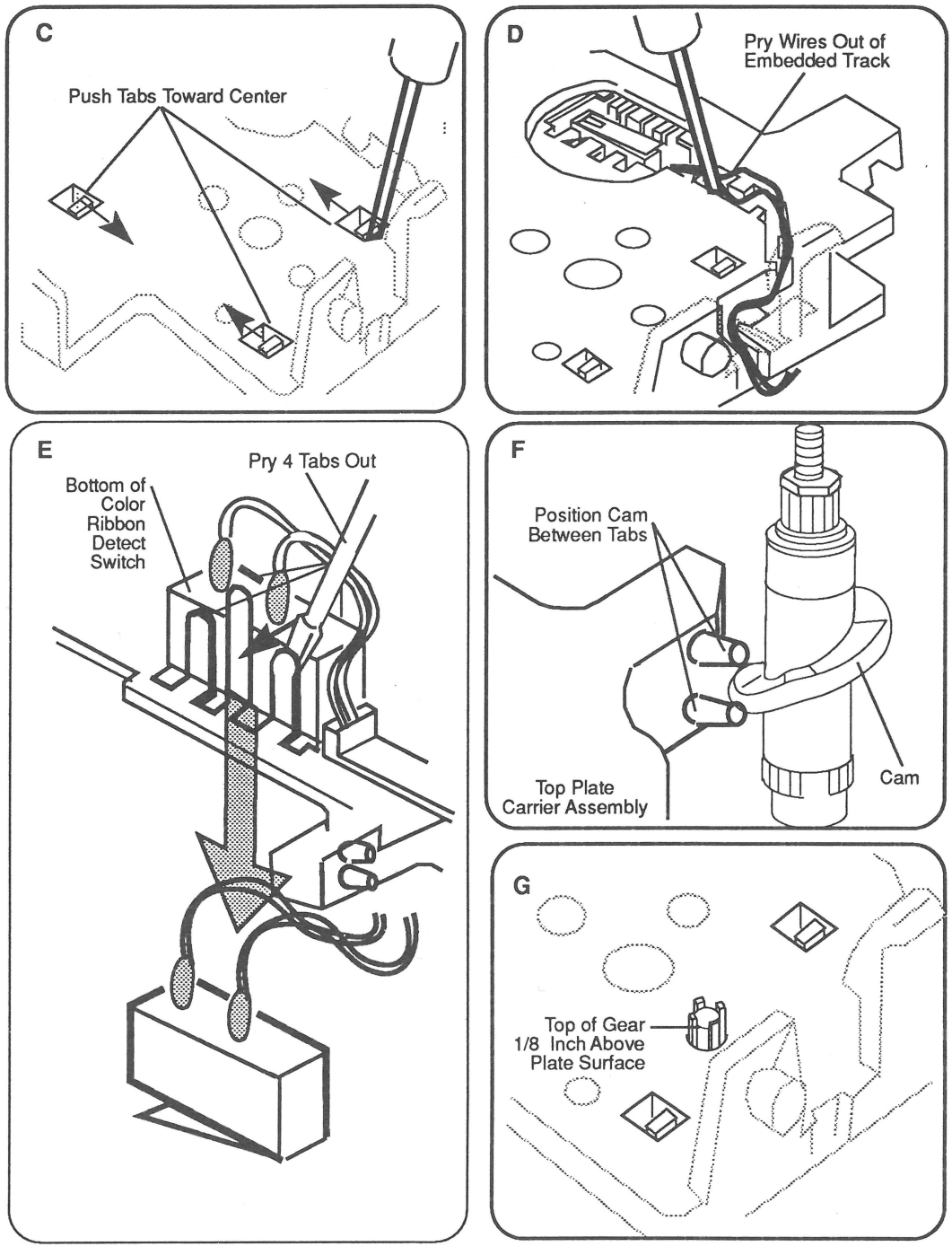


Figure 2-8 Carrier Assembly Top Plate (Continued)

8. Using a jeweler's flathead screwdriver, push the gear assembly tabs toward the center of the ribbon plate **(Figure 2-8C)**.

9. Lift off the top plate, leaving the gear assembly in the carrier housing.

10. Carefully pry the wires out of the embedded track of the top plate **(Figure 2-8D)**. Do not bend the plastic tabs that hold down the wires.

11. Flip over the top plate.

12. Using a small screwdriver, gently pry the four tabs that hold the color ribbon detect switch in place **(Figure 2-8E)**, and at the same time push down on the bottom of the switch so that the switch comes out from the top of the plate.

Replace

1. Make sure that the gear assembly is in place and that the ribbon wire is on correctly and is hooked on both sides of the frame. See the next section "Ribbon Wire and Gear Assembly" for the proper placement of this assembly.

2. Insert the front end of the top plate first so that the two tabs engage the ribbon cam assembly track **(Figure 2-8F)**.

CAUTION: *Verify that the two tabs are riding on the ridge of the color ribbon assembly. If they are not, you may get poor print quality or no printout at all.*

3. Lower the top plate onto the carrier assembly and align it so that the holes line up with the tabs on the gear assembly and the top cross piece of the ribbon advance gear sticks up through the hole on the top plate **(Figure 2-8G)**. Snap the top plate into place.

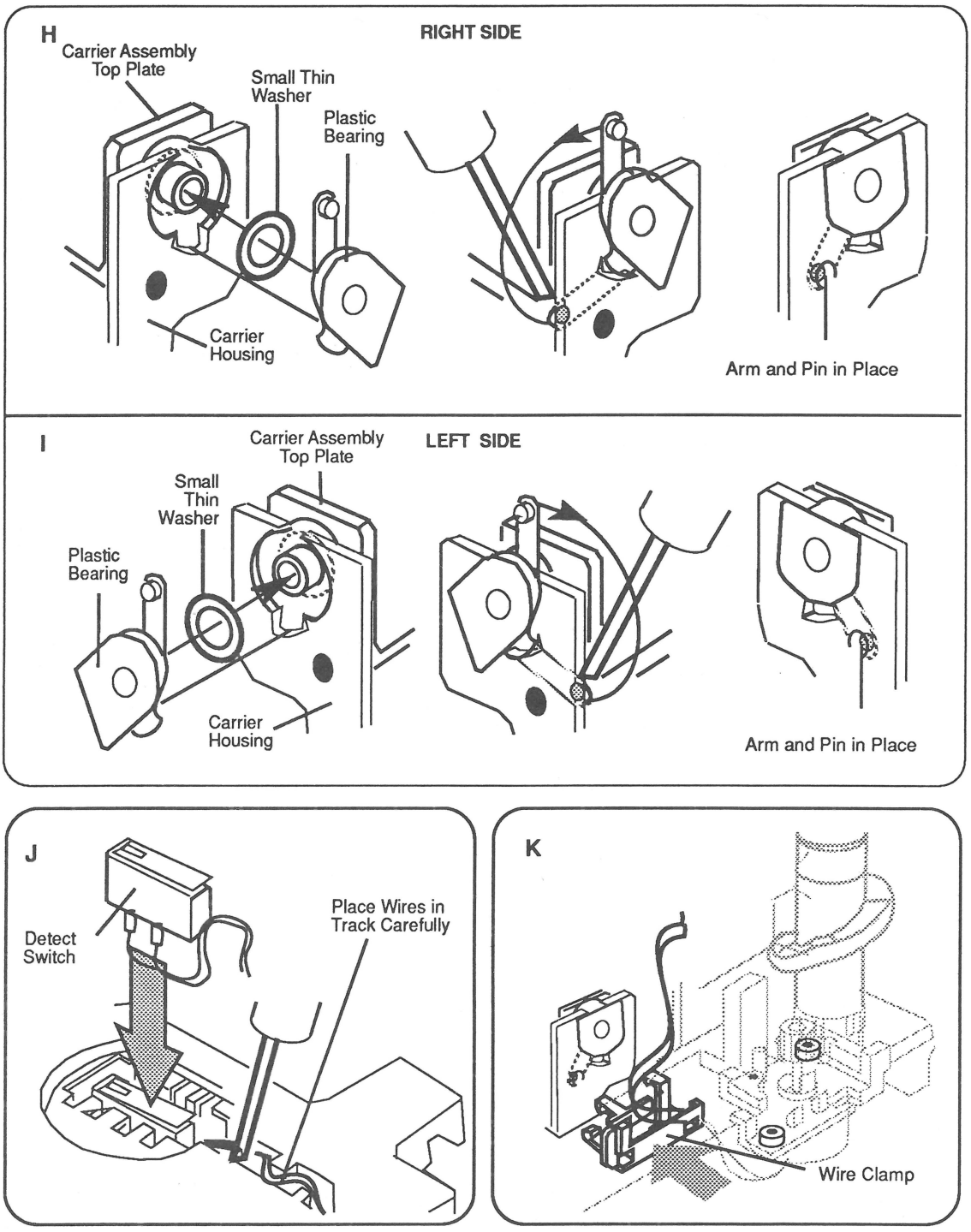


Figure 2-8 Carrier Assembly Top Plate (Continued)

4. Replace the two small plastic bearings with the arms on them. Slide the piece for the right side **(Figure 2-8H)** over the right side of the top plate and carrier assembly. Rotate the piece until the arm pops into the indent hole on the carrier assembly. Repeat this step for the piece on the left side **(Figure 2-8I)**.

5. Gently position and push the ribbon-detect switch into the top of the ribbon plate **(Figure 2-8J)** until it snaps into place.

6. Carefully place the wires under the retainers on the top plate.

7. Place the wires down and along the right edge of the carrier housing and secure them in place with the plastic wire clamp **(Figure 2-8K)** by pushing the clamp until it clicks into place.

8. Replace the top cover.

9. Replace the ribbon cartridge and paper cover.

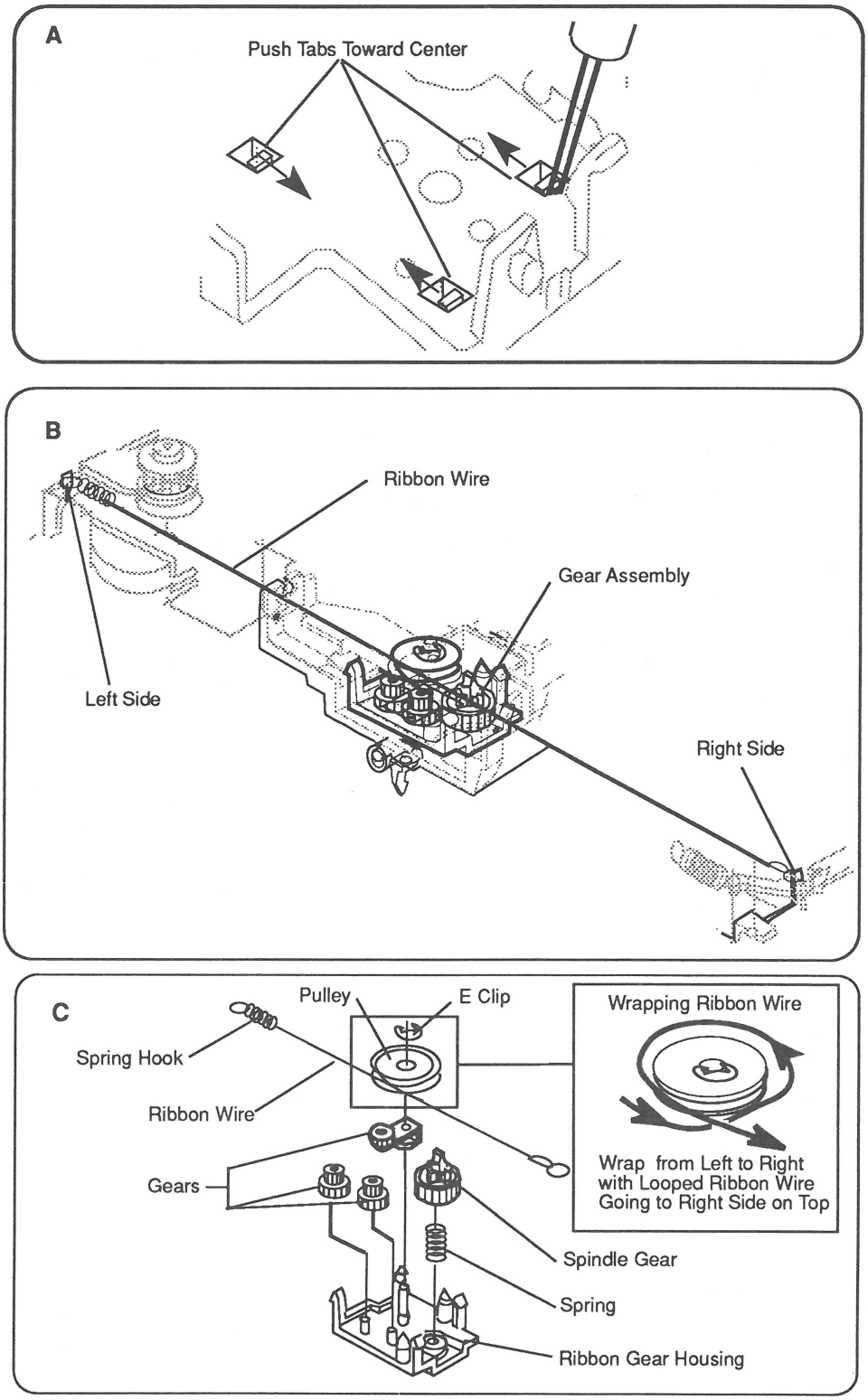


Figure 2-9 Ribbon Wire and Gear Assembly

❑ RIBBON WIRE AND GEAR ASSEMBLY

The ribbon wire and gear assembly sits in the carrier housing and is attached to the bottom of the top plate. The assembly consists of gears, a pulley, and a wire that is attached on each side of the metal frame. As the carrier assembly moves across the printer, the pulley moves the gears that advance the ribbon in the ribbon cartridge.

Remove

1. Remove the carrier assembly top plate.
2. Using a jeweler's flathead screwdriver, push the tabs toward the center of the ribbon plate **(Figure 2-9A)**.
3. Lift off the top plate. The gear assembly remains in the carrier housing **(Figure 2-9B)**.
4. Unhook the ribbon wire from the right side of the frame first and then from the left side of the frame **(Figure 2-9B)**. Remove the ribbon wire.
5. Lift out the gear assembly from the carrier housing.

Replace

The gear assembly is made up of four gears, a pulley, and a spring as shown in **Figure 2-9C**. Refer to this figure as you replace and rebuild the gear assembly.

1. Place the gear assembly into the carrier housing **(Figure 2-9B)**.
2. Rewrap the ribbon wire as shown in **Figure 2-9C**. Put the spring on the left side first. Then wrap the wire around the pulley. Be sure the wire crosses at the front of the gear. Then secure the wire on the right side. Verify that the spring under the ribbon gear is in position before you continue.
3. Replace the carrier assembly top plate.
4. Perform the self-test.

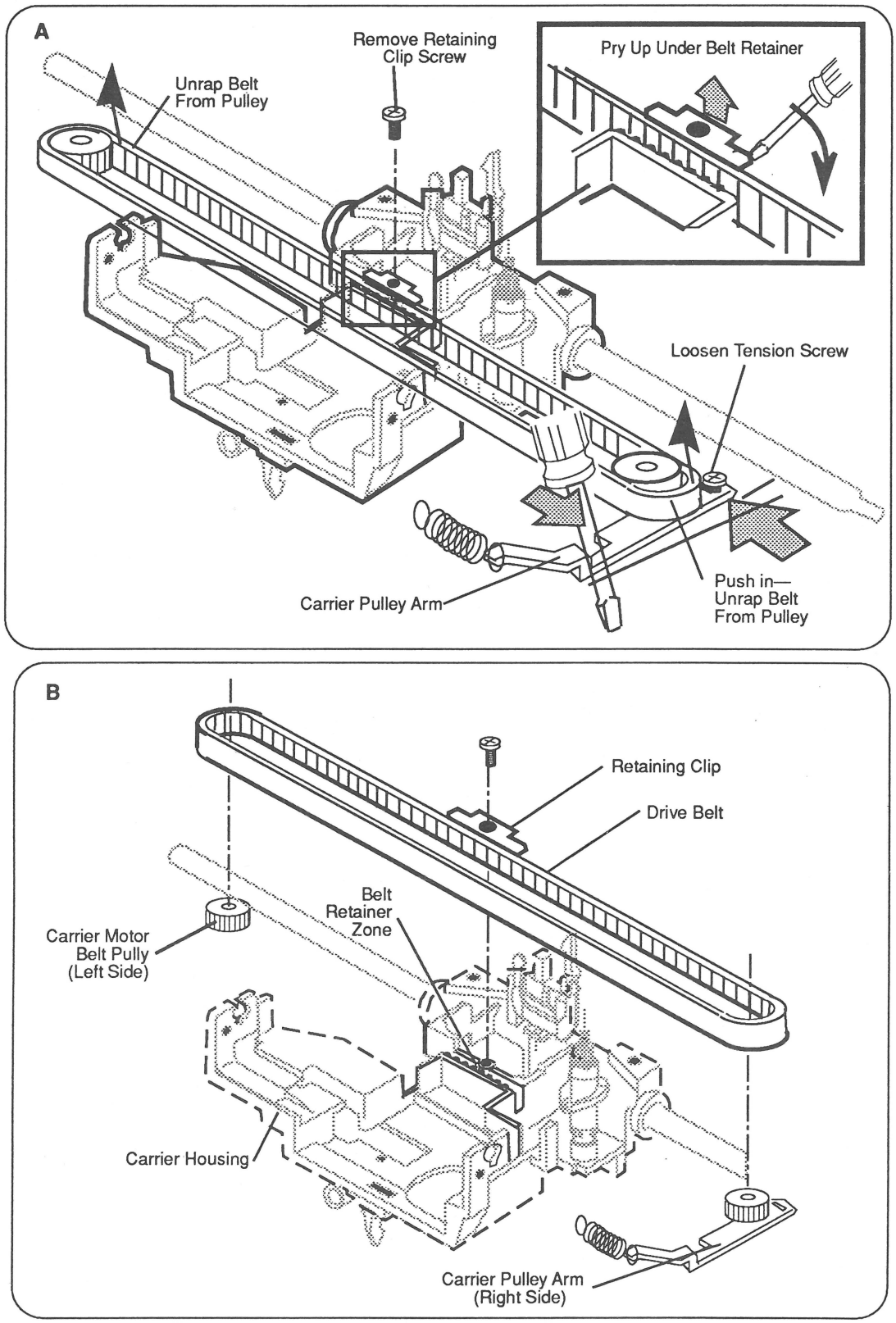


Figure 2-10 Drive Belt

❑ DRIVE BELT

The drive belt is attached to the carrier motor on one end, the carrier assembly in the middle, and a tension pulley on the right side of the frame. It transmits the carrier motor movement to the carrier assembly.

Remove

1. Remove the carrier assembly top plate.
2. Loosen the pulley tension plate by loosening the screw on the plate **(Figure 2-10A)** on the right side of the printer. Do not remove the screw.
3. To remove the drive belt from the right side pulley, put a large screwdriver between the carrier pulley arm and the metal frame, and push the screwdriver toward the right side. This action releases tension on the pulley and the belt. Remove the drive belt from the right side pulley.
4. Remove the drive belt from the left side pulley.
5. Remove the screw from the retaining clip located in the middle of the carrier housing **(Figure 2-10A)**.
6. Using a small flatblade screwdriver, pry up the retaining clip from the housing. The belt is attached to the clip and will stay with the clip.

Replace

1. Insert the new belt and retaining clip into the grooved opening on the carrier housing **(Figure 2-10B)**, and secure with the screw.
2. Make sure the front side of the belt is laying in the channel of the carrier housing and slip the left side of the drive belt onto the left pulley.
3. With the tension plate screw loose on the right side, use a screwdriver to pry the carrier pulley arm and slip the right side of the drive belt onto the right pulley.
4. Tighten the tension screw.
5. Replace the carrier assembly top plate.
6. Perform the self-test.

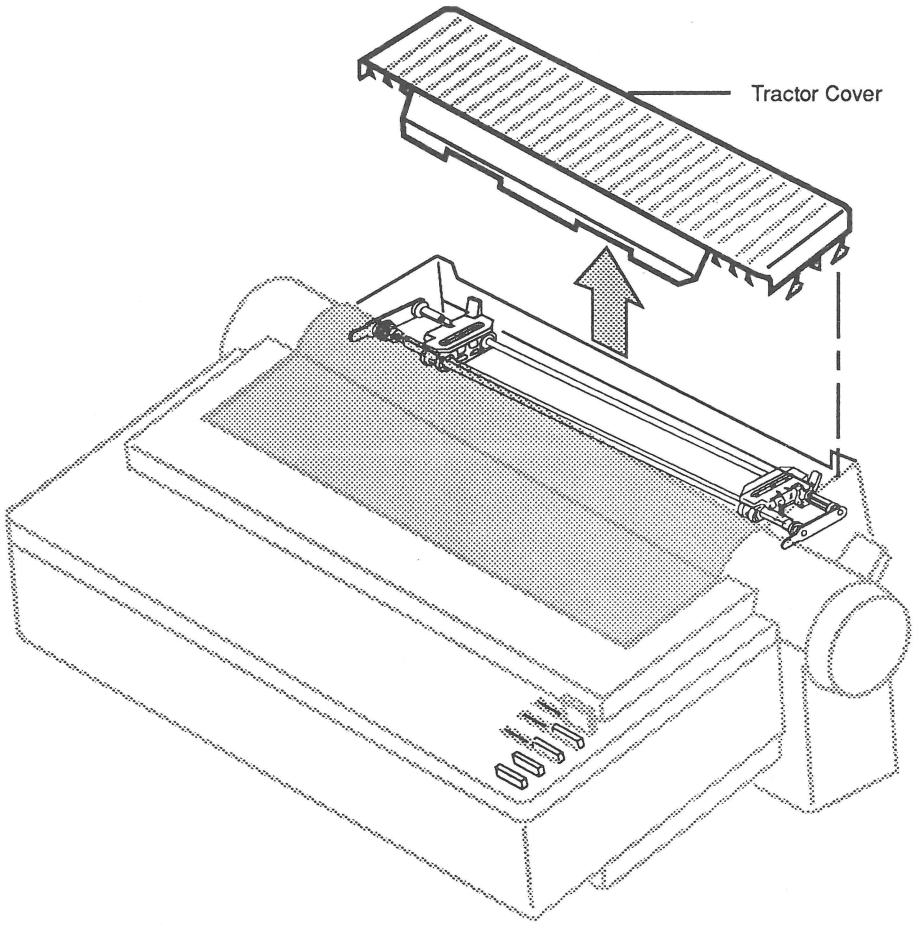


FIGURE 2-11 Tractor Cover

❑ TRACTOR COVER

The tractor cover is located on the top back of the printer and covers the tractor assembly.

Remove

To remove the tractor cover, grasp the tractor cover on the back side and pull up **(Figure 2-11)**.

Replace

To replace the tractor cover, place the tractor cover on the back side of the printer and slide it into place **(Figure 2-11)**.

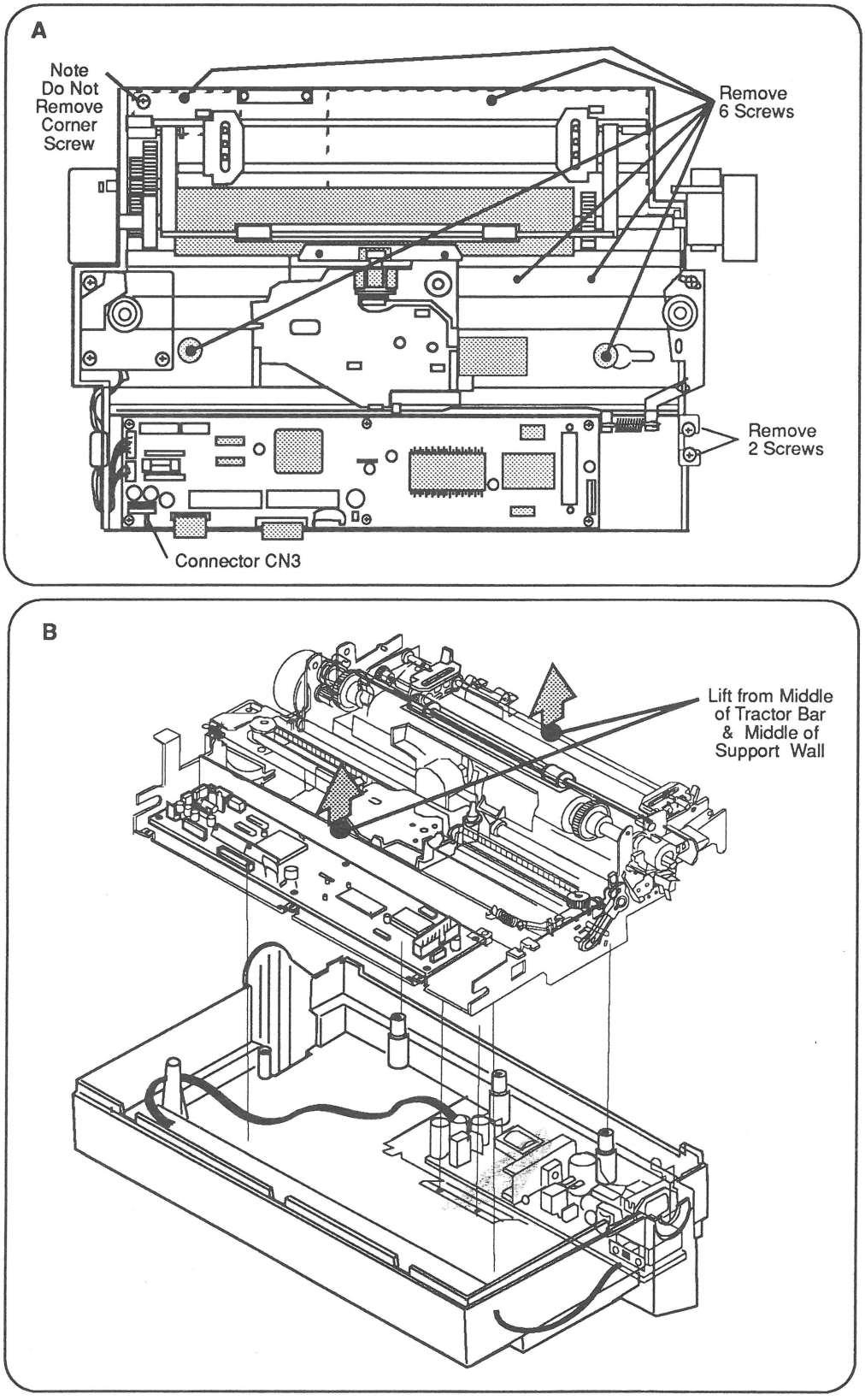


Figure 2-12 Mechanical Assembly

❑ MECHANICAL ASSEMBLY

The mechanical assembly is the whole metal frame that sits inside the plastic bottom case. It is removed as a unit. In order to remove any of the modules that follow in this section, the mechanical assembly must be removed first.

Note: The mechanical assembly is not available as a replacement part.

Remove

Refer to the sequence in **Figure 2-12** as you remove and replace the mechanical assembly.

1. Remove the paper cover.
2. Remove the tractor cover.
3. Remove the top cover.
4. Remove the six screws that hold the mechanical assembly to the bottom case **(Figure 2-12A)**.

   Note: Do not remove the screw located at the back of the assembly nearest the left side. This screw holds the sub PCB board in place.

5. Remove the two screws that hold the power switch cable in place.
6. Disconnect the connector at CN3 on the main logic board if the main logic board is in the printer.
7. With one hand grasping the middle of the back tractor bar **(Figure 2-12B)** and the other hand holding the middle of the support wall, lift the entire mechanical assembly from the plastic case.

Replace

1. Hold the mechanical assembly over the bottom case and carefully lower the assembly down into the case, aligning the six screw holes.

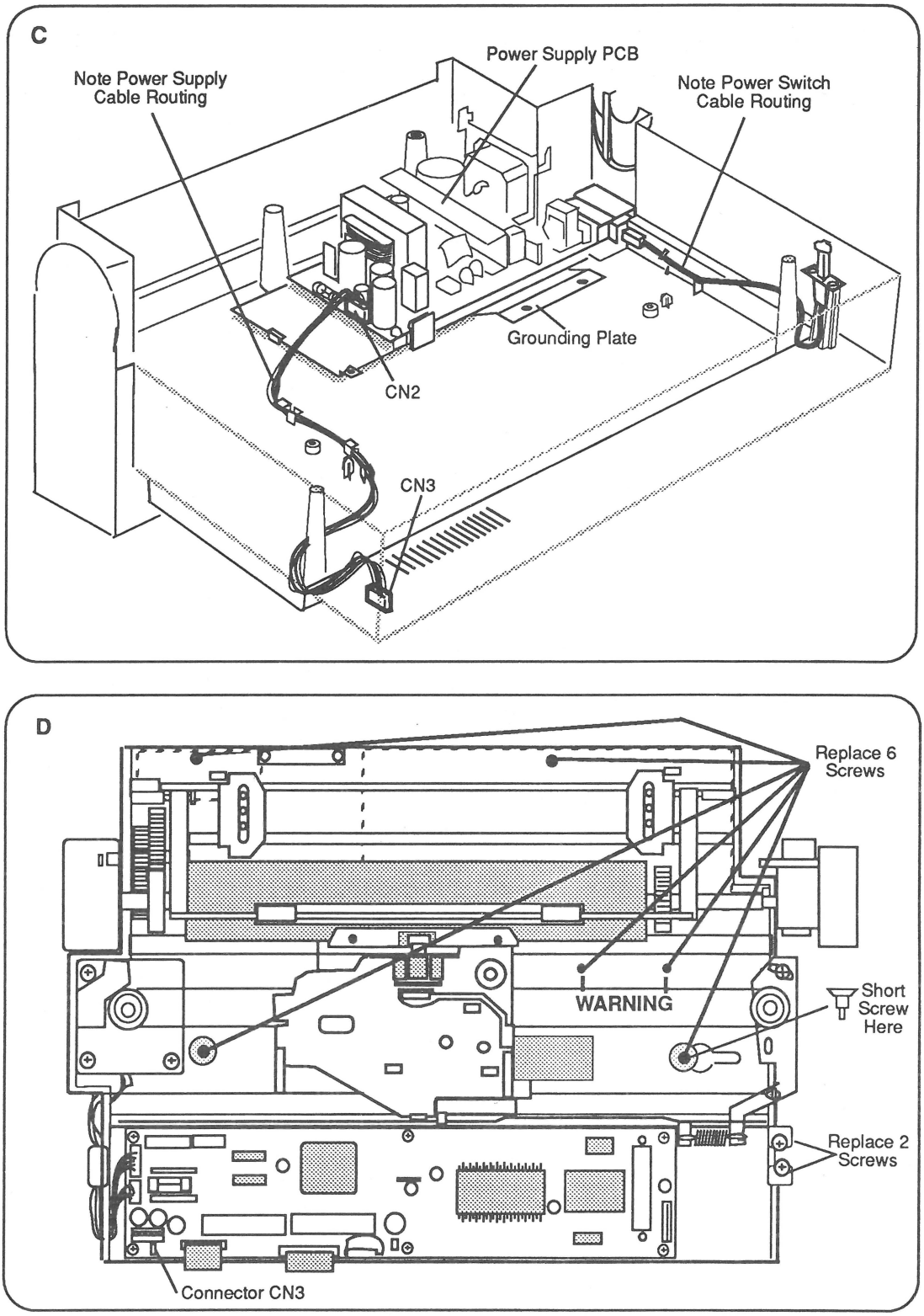


Figure 2-12 Mechanical Assembly (Continued)

CAUTION: *As you lower the assembly into place, make sure of the following: (1) The power supply cable must be routed correctly on the bottom of the case and the connector from this cable should end up on top of the main logic board area. (2) The power switch cable must be aligned correctly on the right side of the case so that the cable does not get pinched when the assembly is lowered into place.*

2. Connect the power supply connector at CN3 on the main logic board. (If the logic board is not on the mechanical assembly at this time, skip this step and attach the connector when you replace the logic board.)

3. Use the screws to attach the power switch cable to the metal frame bracket on the right side **(Figure 2-12C)**. The cable bracket goes under the frame bracket. Make sure that the cable from the switch is not pinched under the mechanical assembly.

   Note: The shorter of the two black screws that go into the rubber grommets on the bottom of the mechanical assembly plate must be installed on the right side when putting the assembly back in.

4. Replace the six screws that attach the mechanical assembly to the bottom case **(Figure 2-12D)**.

WARNING: *Two screws (shown in* ***Figure 2-12D****) are attached to the base plate of the power supply. These screws must be reinstalled when you replace the mechanical assembly because they make the ground connection between the power supply plate and the rest of the mechanical assemblies. If they are not replaced, the ground plane is not complete and logic errors can occur. Also, not completing the ground plane could cause a dangerous condition.*

5. Replace the top cover.

6. Replace the tractor cover.

7. Replace the paper cover.

8. Perform the self test.

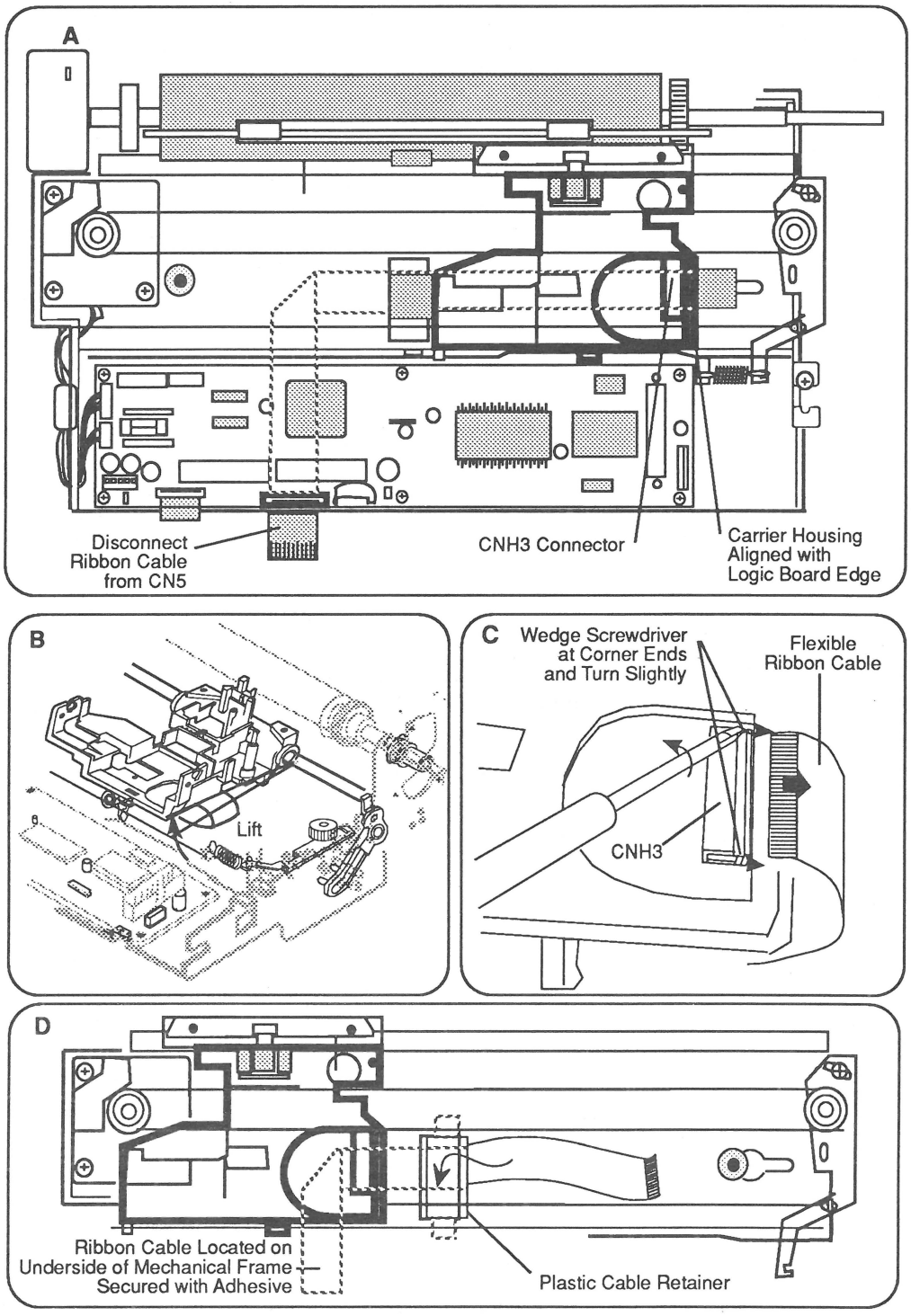


Figure 2-13 Flexible Ribbon Cable

❑ FLEXIBLE RIBBON CABLE

The flexible ribbon cable connects the main logic board with the carrier assembly through the print head PCB. The signals on this ribbon cable are the print head signals, ribbon motor cam signals, color ribbon detect signals, and the home position switch signals.

Remove

1. Remove the mechanical assembly.
2. Remove the carrier assembly top plate.
3. Remove the ribbon cable from connector CN5 on the main logic board **(Figure 2-13A)**.
4. Move the carrier assembly toward the right side of the mechanical assembly so that the right edge of the carrier assembly is lined up with the right edge of the logic board or platen **(Figure 2-13A)**.
5. Lift the front of the carrier assembly and tilt it up **(Figure 2-13B)** until you hear a snap. This allows the carrier assembly to swing up and down on the shaft; it also allows you access to the ribbon connector cable on the bottom of the print head PCB.

   Note: If you don't have enough clearance, you can remove the ribbon wire and also loosen the drive belt from around the pulleys.
6. Insert a small flathead screwdriver into the notch on the flexible cable connector **(Figure 2-13C)**. Gently turn the screwdriver, and the connector will pop out about 1/8 inch.

CAUTION: *Do not force the flexible cable to come loose or you will damage the cable.*

7. Remove the flexible cable from the connector.
8. Push the carriage assembly to the far left. Remove the cable retainer **(Figure 2-13D)**.
9. It is possible that the cable will be glued to the bottom side of the metal case. If it is, pry the cable loose.

Replace

1. Place the new cable through the hole in the bottom of the mechanical assembly.
2. Push the ribbon cable into the connector on the print head PCB, and push in the two sides of the connector to lock the cable in place.
3. Replace the ribbon retainer.
4. Press down on the carrier assembly to snap it back into position.
5. Connect the other end of the ribbon cable to connector CN3 on the main logic board.
6. Replace the top plate assembly.
7. Replace the mechanical assembly.
8. Perform the self-test.

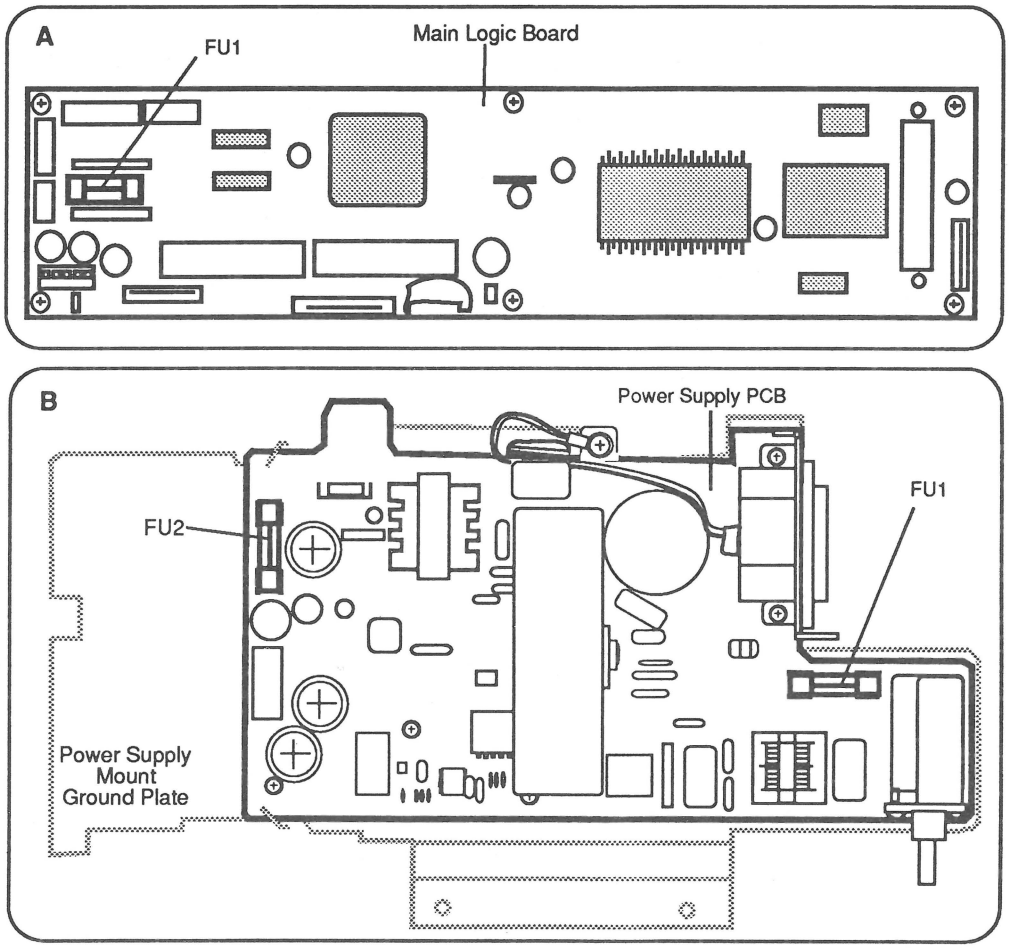


Figure 2-14 Fuses

❑ FUSES

The printer is equiped with three fuses. One is located on the main logic board. The other two are located on the power supply board. Check the fuses to verify that they are good. If a fuse is bad, replace it.

Main Logic Board

The main logic board fuse is located on the left front end of the board **(Figure 2-14A)** and fuses the +26 volt motor drive voltage.

1. Remove the top cover to expose the logic board.
2. Using the fuse puller, pull the fuse up and out of the holder. Check to see if the fuse is open. If you can't be sure, use the multimeter and check for continuity.
3. Replace the fuse if it is defective.

Power Supply

Fuses FU1 and FU2 are located on the power supply board **(Figure 2-14B)**.

1. Remove the mechanical assembly.
2. Using the fuse puller, pull the fuses up and out of their holders. Check to see if the fuses are open. If you can't be sure, use the multimeter and check for continuity.
3. Replace any defective fuses.
4. Replace the mechanical assembly.

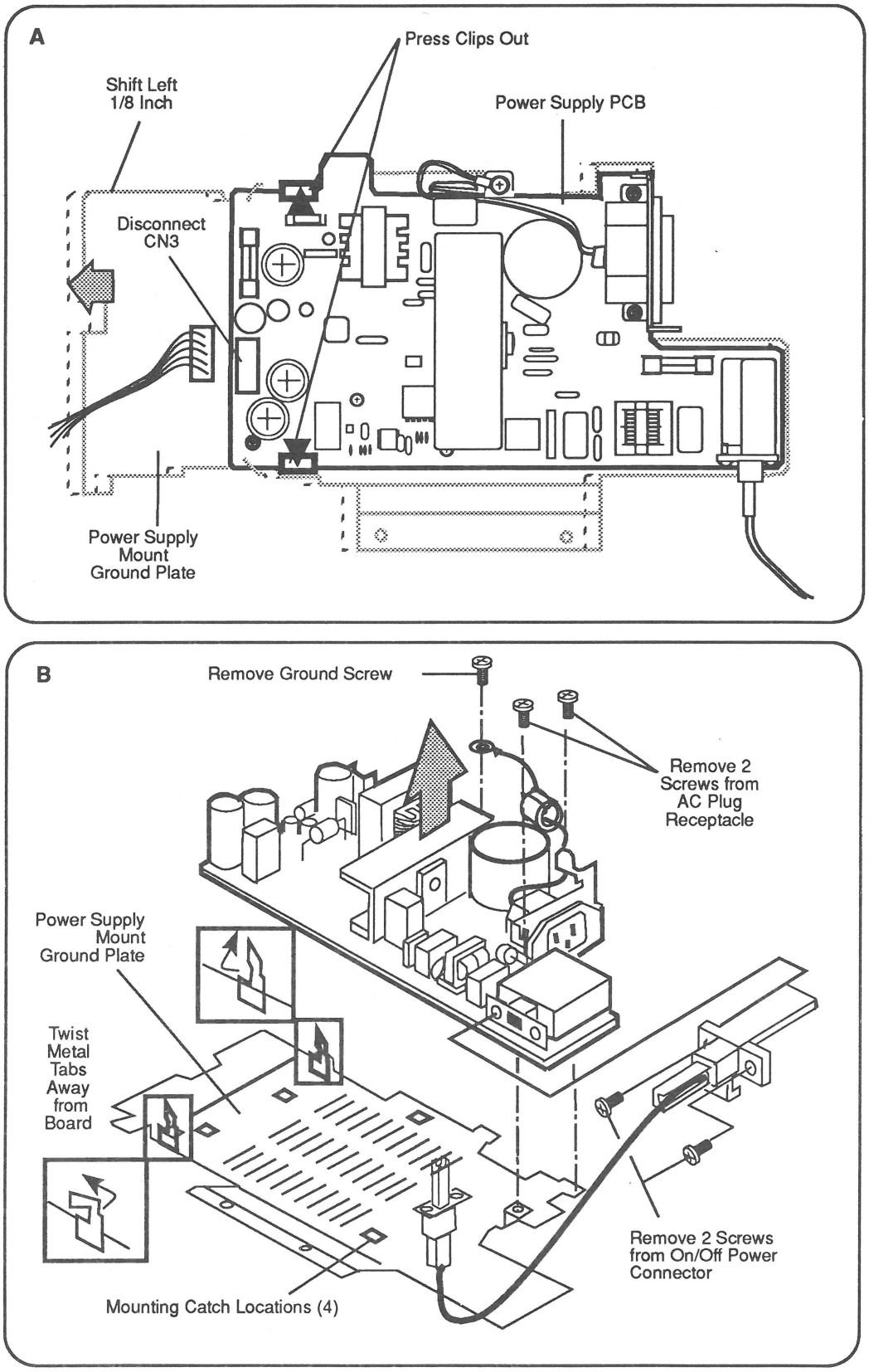


Figure 2-15 Power Supply Board

❑ POWER SUPPLY BOARD

The power supply board supplies the various voltages needed in the printer. The power supply board is located on the back right side of the bottom case, under the mechnical assembly.

Remove

1. Remove the mechanical assembly.
2. Slide the power supply assembly to the left as far as it will go (about 1/8 inch).
3. Pry back the two clips **(Figure 2-15A)** that hold the board to the bottom case.
4. Lift up on the power supply board and remove it from the bottom case.

   Note: The power supply PCB, the bottom metal ground plate, and the on/off switch cable are separate items. When you are replacing a power supply, you must remove the ground plate and the on/off switch cable and use them on the new power supply PCB.

Ground Plate

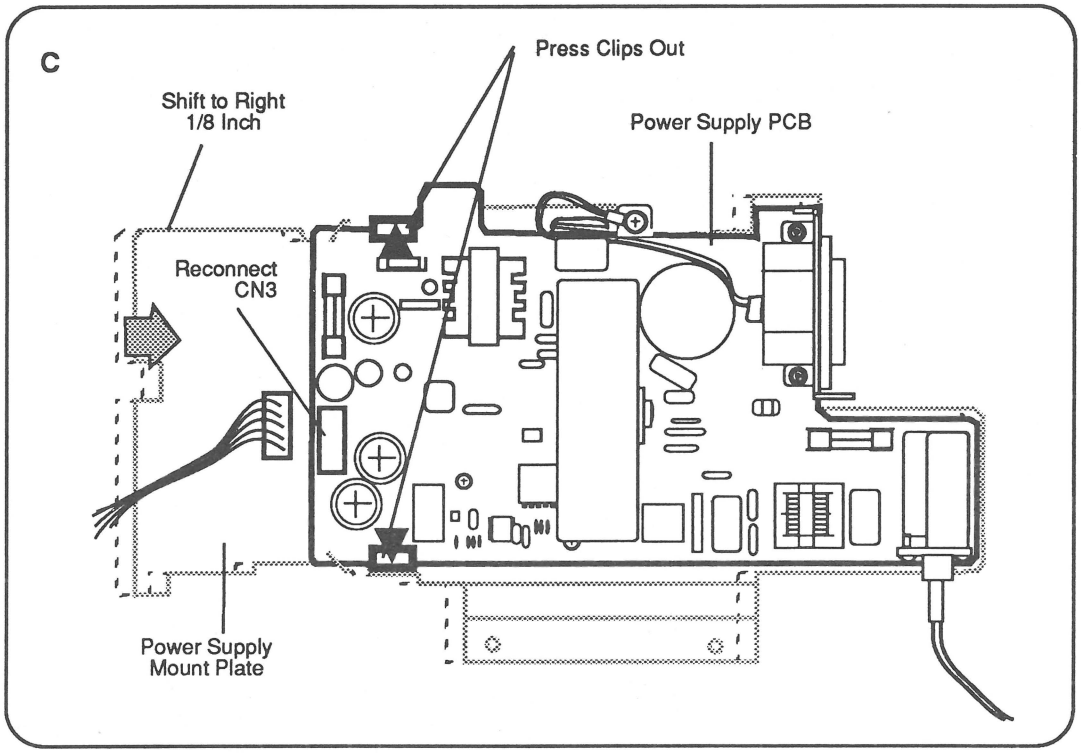
5. Remove the two screws from the AC plug receptacle **(Figure 2-15B)**. The metal bracket will come off.
6. Remove the screw that secures the ground wire to the ground plate.
7. Bend the two tabs out so they are parallel with the PCB, and pull the PCB away from the metal ground plate.

On/Off Power Switch Cable

8. Remove the two screws from the on/off power switch cable **(Figure 2-15B)**.

Replace

1. Place the PCB on the ground plate and twist the two metal tabs **(Figure 2-15B)** in toward the center of the board about 1/8 of an inch.
2. Replace the screw that secures the ground wire onto the ground plate.
3. Replace the metal bracket around the AC plug receptacle, and replace the two screws.



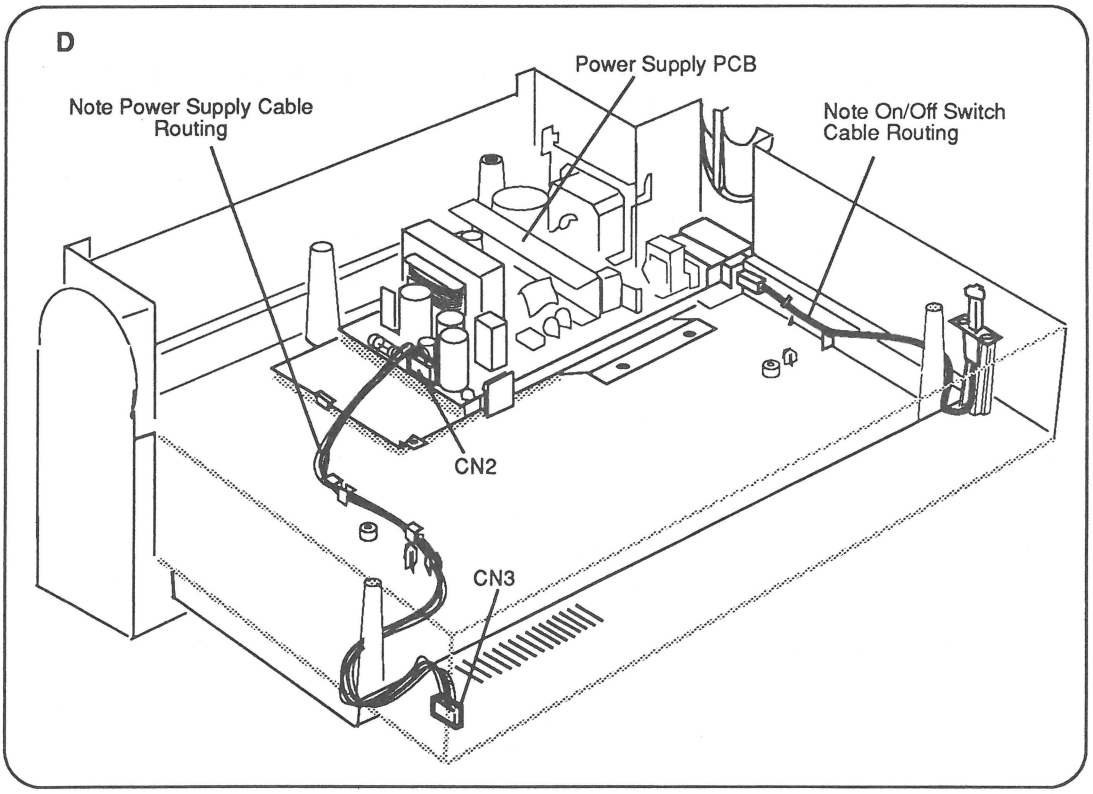


Figure 2-15 Power Supply Board (Continued)

4. Replace the on/off power switch cable.

5. Place the power supply assembly in position in the bottom case and press it down so that the two clips snap over the edge of the power supply PCB **(Figure 2-15C)**. Slide the board over to the right side of the case.

6. Run the on/off power switch cable along the right side of the case as shown in **Figure 2-15D** and leave it laying along the side until the mechanical assembly is replaced.

CAUTION: *It is important that the on/off power switch cable be in the correct place, otherwise it can get pinched under the mechanical assembly and will not function correctly.*

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7. Replace the mechanical assembly.

8. Perform the self test.

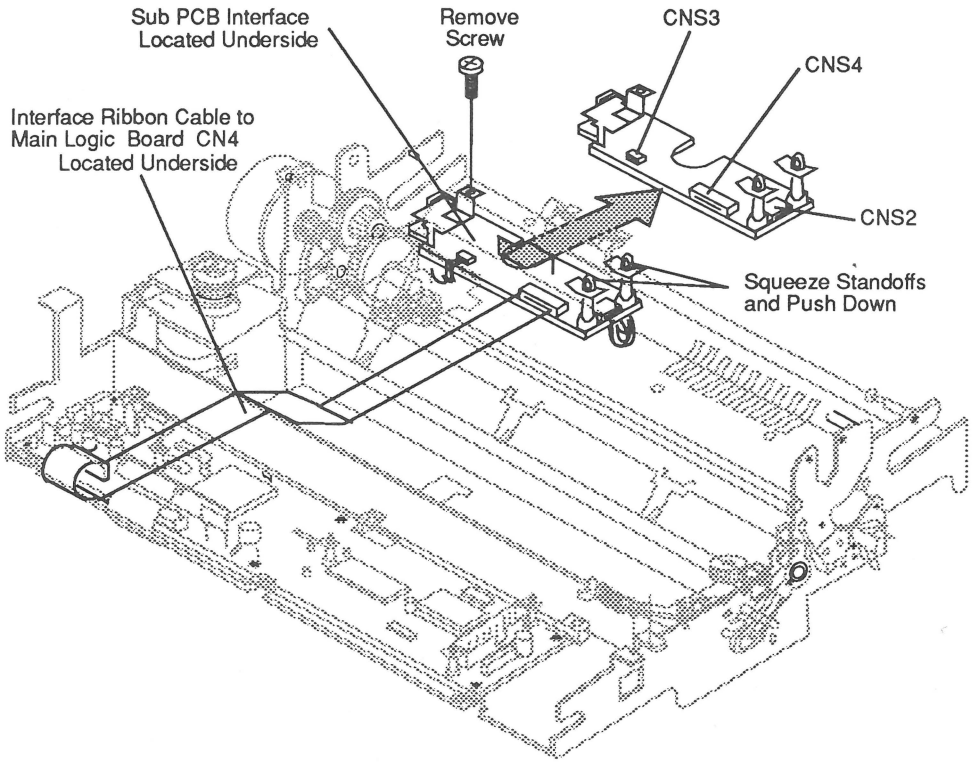

Figure 2-16 Sub PCB

❑ SUB PCB INTERFACE BOARD

The sub PCB interface board is located under the right rear side of the mechanical assembly, if viewed from the back of the printer. The sub PCB is held in place with one screw and two plastic standoffs. Refer to **Figure 2-16** as you remove and replace the sub PCB.

Remove

1. Remove the mechanical assembly.
2. Remove the one screw.
3. Remove the two standoffs by squeezing from the bottom and pushing down.
4. Remove the eight-wire connector CNS2 from the cut-sheet feeder by gently prying on one side of the connector and then the other.
5. Remove the three-wire connector CNS3 from the paper out sensor.
6. Gently pull out the 18-pin connector CNS4 so that the ribbon cable can be removed.

   Note: If you are replacing the ribbon cable, disconnect the other end of the ribbon cable from connector CN4 on the main logic board.

Replace

1. Reconnect the ribbon cable in connector CNS4.
2. Reconnect the paper-out sensor connector CNS3.
3. Reconnect the cut-sheet feeder connector CNS2.
4. Push the sub PCB onto the two standoffs.
5. Replace the screw.
6. Replace the mechanical assembly.
7. Perform the self test.

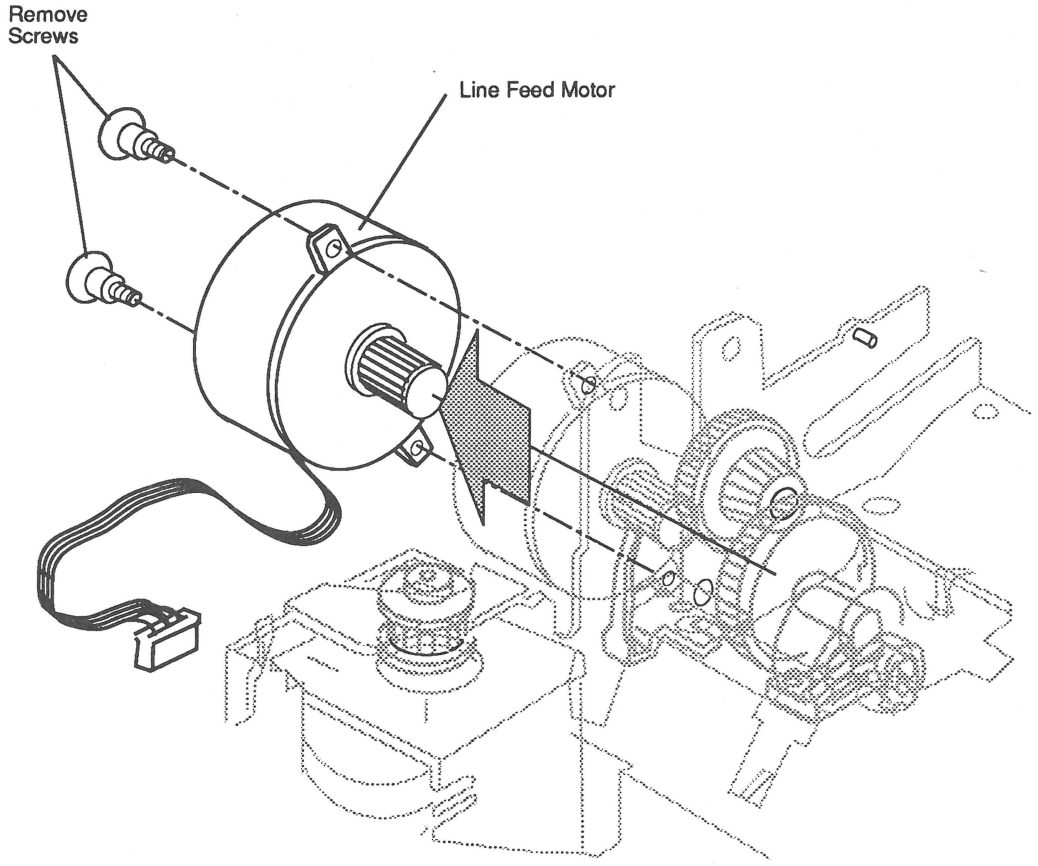

Figure 2-17 Line Feed Motor

❑ LINE FEED MOTOR

The line feed motor is located on the left side of the mechanical assembly frame. This motor drives the paper around the platen.

Remove

1. Remove the mechanical assembly.
2. Remove connector CN1 from the main logic board.
3. The wires going from the motor to the main logic board are tie-wraped with the wires from the carrier motor. Cut the tie wraps.
4. Locate the line feed motor **(Figure 2-17)** and remove the two screws that hold the motor in place.
5. Gently pull the motor off the mechanical assembly.

Replace

1. Slide the line feed motor onto the mechanical assembly.
2. Replace the two screws that hold the motor in place.
3. Run the wires from the motor to the front-left side of the main logic board and connect them to CN1 on the main logic board.
4. Tie wrap the line feed motor wires to the carrier motor wires.
5. Replace the mechanical assembly.
6. Perform the self test.

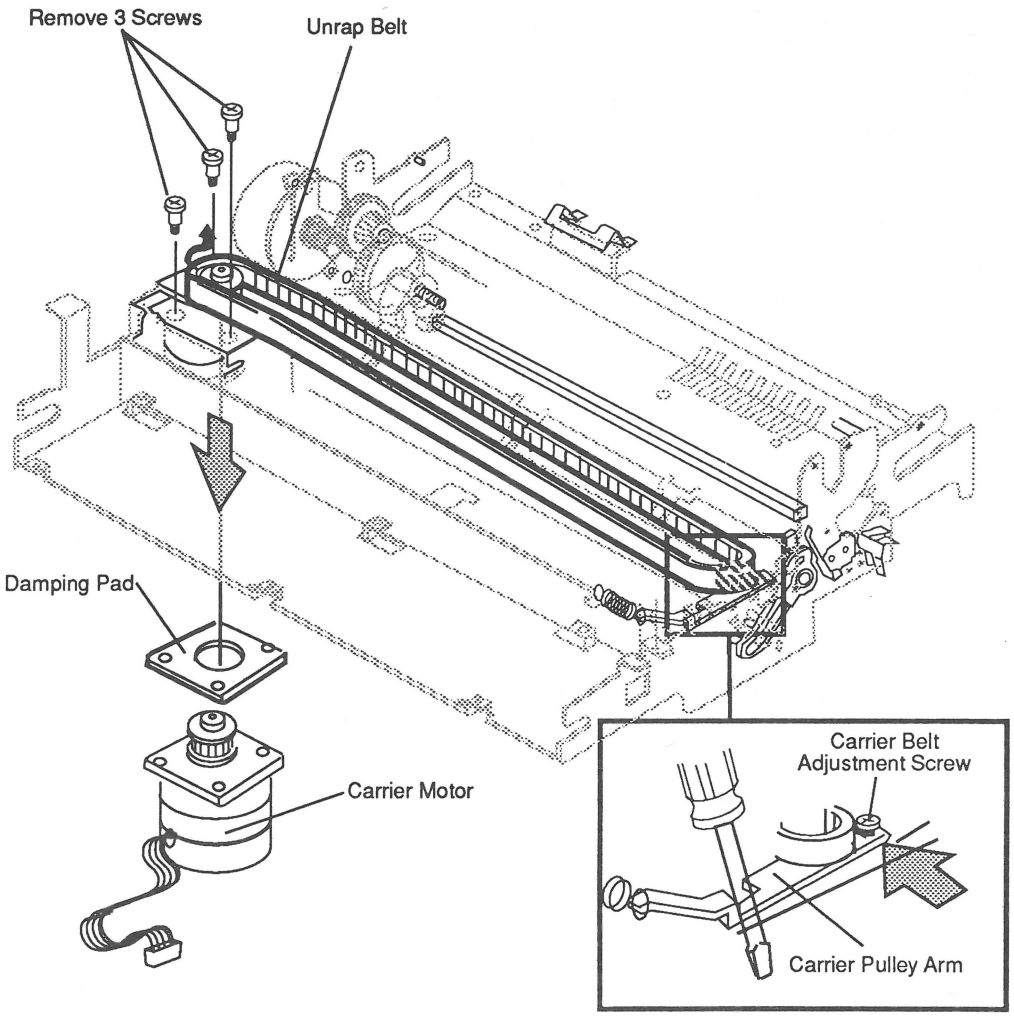

Figure 2-18 Carrier Motor

❑ CARRIER MOTOR

The carrier motor is located on the bottom-left side of the mechanical assembly. Its function is to move the carrier assembly back and forth across the platen.

Remove

1. Remove the mechanical assembly.
2. Loosen the carrier belt tension plate adjustment screw, but do not remove it **(Figure 2-18)**.
3. To remove the drive belt from the right side pully, put a large screwdriver between the carrier pulley arm and the metal frame and push the screwdriver toward the right side. This action releases tension on the pulley and the belt. Remove the drive belt from the right side pulley.
4. Remove the belt from the left side motor pulley.
5. Remove the three screws holding the carrier motor in place. The motor will drop out.

Note: There is a damping pad between the motor and the frame. This pad is self-adhesive and is pressed onto the frame. It is possible that when the motor comes out, the pad will stay in place. If the pad stays in place, inspect it for any damage. If it looks good, leave it on and use it with the new motor. If the pad comes off or is damaged, replace it with a new pad.

Replace

1. If it is necessary to replace the damping pad, align the pad with the screw holes on the frame and press the adhesive side onto the frame.
2. Position the carrier motor so that the connector and wires face the front of the machine. Replace the three screws, and put the drive belt on the motor pulley.
3. Push in on the carrier pulley arm, and replace the carrier belt on the right pulley.
4. Tighten the carrier belt adjustment screw.
5. Replace the mechanical assembly.

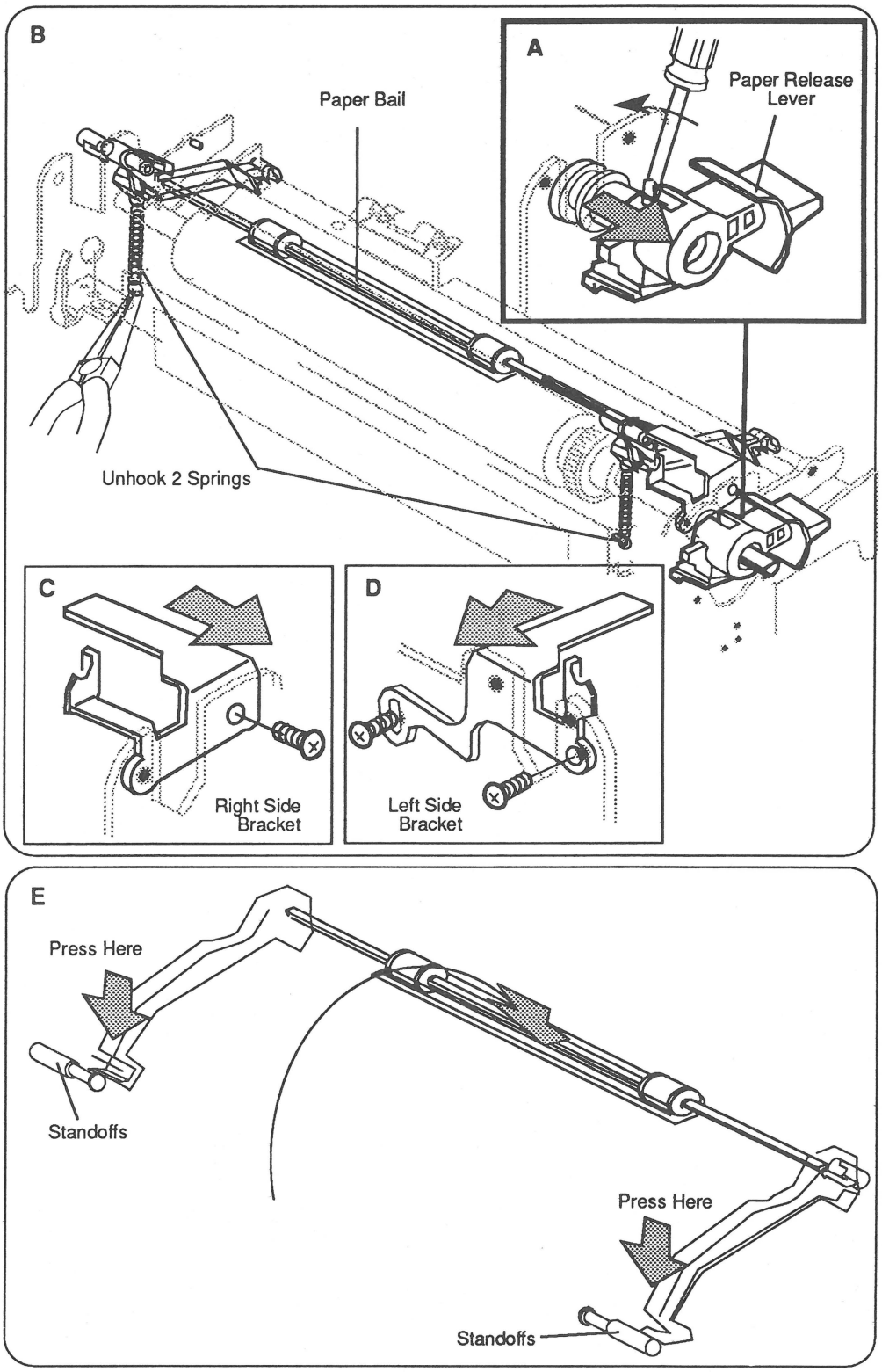

Figure 2-19 Paper Bail Assembly

❑ PAPER BAIL ASSEMBLY

The paper bail assembly is located across the top of the platen. It holds down the paper after it passes the print head.

Remove

1. Remove the mechanical assembly.
2. Remove the paper release lever by inserting a small screwdriver into the slot between the metal frame and the plastic catch **(Figure 2-19A)** and prying out.
3. Using a small needlenose pliers, unhook the two springs, one on each side of the platen **(Figure 2-19B)**.
4. Unscrew and remove the right side bracket **(Figure 2-19C)**.
5. Unscrew and remove the left side bracket **(Figure 2-19D)**.
6. Lift up on the paper bail, rotate it to the back position, and gently push down on the bail so it snaps off the standoffs **(Figure 2-19E)**.

Replace

1. Hold the paper bail so that it points toward the rear of the printer. Snap the two clips onto the standoffs on the frame **(Figure 2-19E)**.
2. Bring the paper bail forward to its normal position.
3. Set the left bracket into place and secure it with the two screws **(Figure 2-19D)**.
4. Set the right bracket into place and secure it with the screw **(Figure 2-19C)**.
5. Rehook the two springs **(Figure 2-19B)**.
6. Replace the paper release lever.
7. Replace the mechanical assembly.
8. Perform the self test.

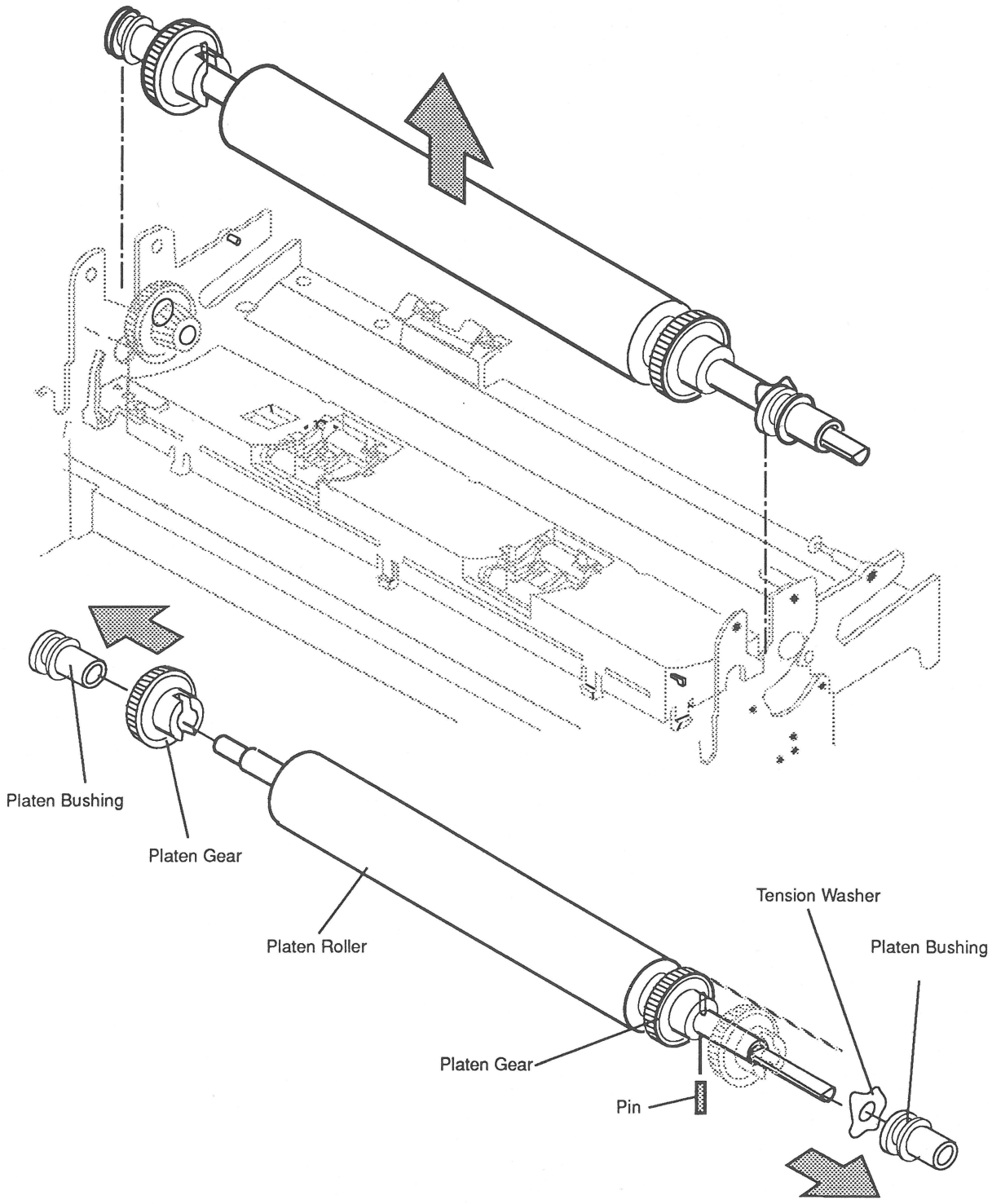

Figure 2-20 Platen Roller and Gears

❑ PLATEN ROLLER AND GEARS

The platen is the roller that is behind the paper when the wires from the print head strike the paper. It is the long, round, hard-rubber object that lays across the printer **(Figure 2-20)**.

Remove

1. Remove the mechanical assembly.
2. Remove the print head and paper guide.
3. Remove the paper bail assembly.
4. Lift the platen out.

Platen gears

5. On the left side of the platen, slide the black plastic bushing off and remove the gear.
6. On the right side, remove the black plastic bushing and the tension washer.
7. Using a pin punch, gently tap out the pin. Once the pin is removed, the right-side gear will come off.

Replace

1. Assemble the right side of the platen **(Figure 2-20)** by sliding the drive gear into position, inserting the pin, gently tapping the pin down into the shaft, and sliding the tension washer into position.
2. Slide the right side platen bushing onto the platen shaft.
3. Assemble the left side of the platen by sliding the left gear and platen bushing onto the platen shaft.
4. Line up both the right and left side bushings with the cut outs on the frame and place the platen back into place.
5. Replace the paper bail assembly.
6. Replace the print head and paper guide.
7. Replace the mechanical assembly.
8. Perform the self-test.

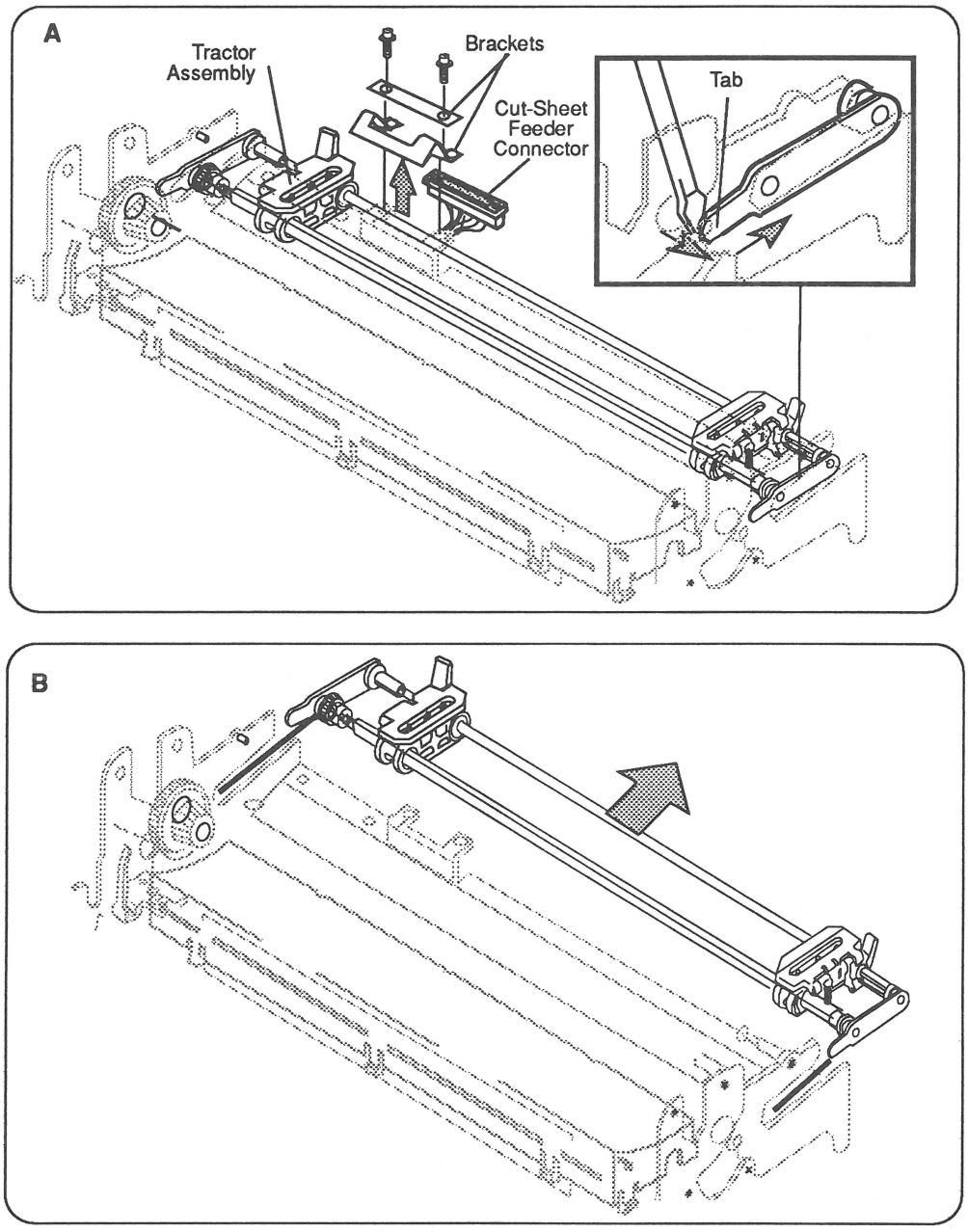

Figure 2-21 Tractor Assembly

❑ TRACTOR ASSEMBLY

The tractor assembly holds the tractor gears that feed the paper when pin feed drive is selected. The assembly is made up of the gear drives and the spring-loaded doors that hold the paper in place on the pin gears.

Remove

1. Remove the mechanical assembly.
2. Remove the paper bail assembly.
3. Remove the cut-sheet feeder connector and brackets shown in **Figure 2-21A**.
4. Using a small screwdriver, pry back the black plastic tab inside the hole on the right-rear side of the frame, and gently pull back on the tractor assembly about 1/4 of an inch.
5. Repeat step 4 to release the left side of the assembly.
6. When both sides have been released from the indents on the metal frame, pull the tractor assembly straight out the rear of the mechanical assembly **(Figure 2-21B)**.

Replace

1. Hold the plastic end pieces **(Figure 2-21B)** on each end of the tractor assembly and slide the tractor assembly into the frame slot until the black tabs snap into the indents on the frame.
2. Place the connector bracket on top of the cut sheet feeder connector so that the extension of the connector bracket **(Figure 2-21A)** faces the wide side of the connector and extends up into the printer and then down.
3. Replace the two screws through the brackets and the cut-sheet feeder connector.
4. Replace the paper bail assembly.
5. Replace the mechanical assembly.
6. Perform the self test.

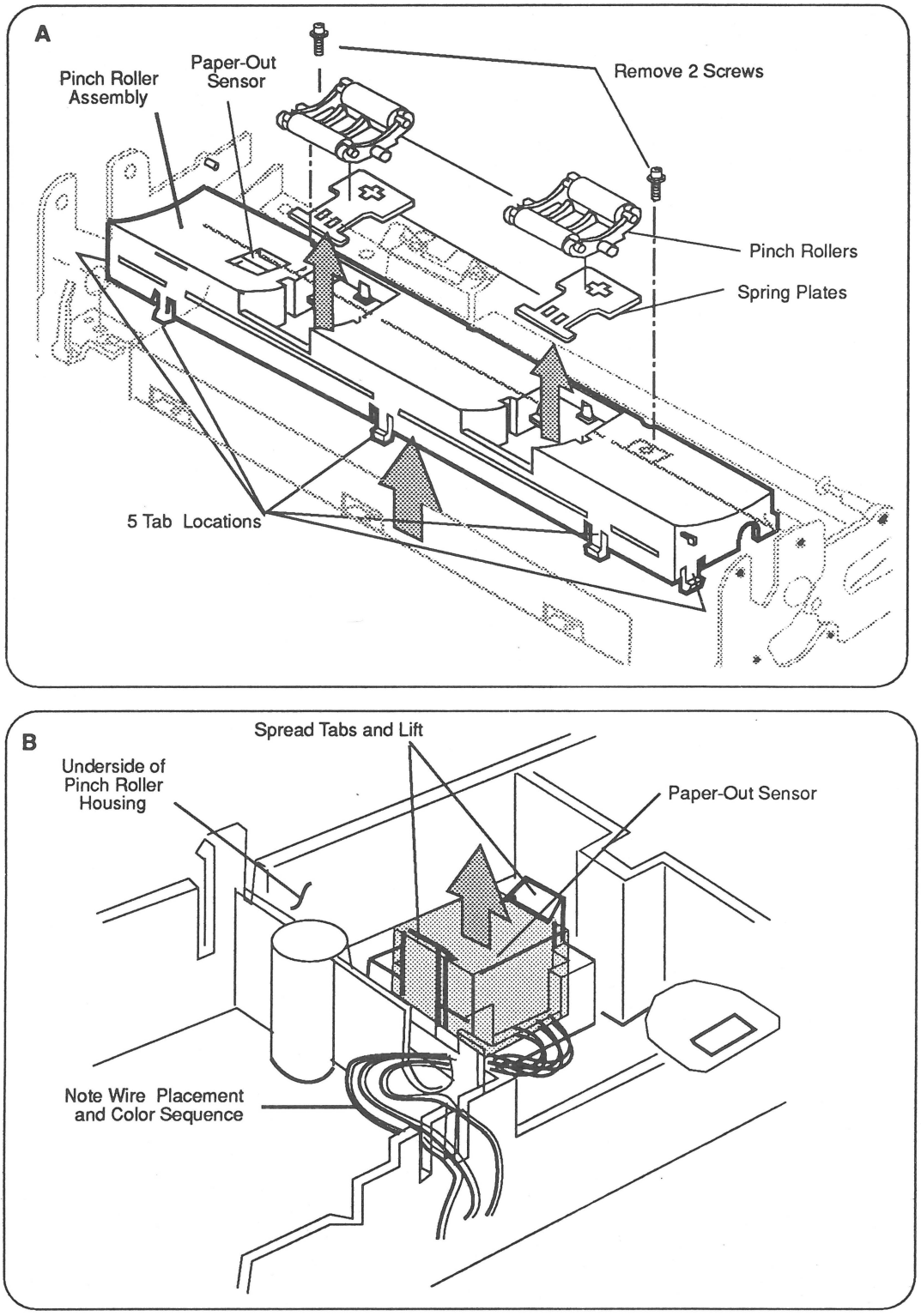

Figure 2-22 Pinch Roller Assembly

❑ PINCH ROLLER ASSEMBLY / PAPER-OUT SENSOR

The pinch roller assembly contains two sets of pinch rollers, the paper-out sensor, and the black plastic housing that holds them. It is located under the platen.

Remove

1. Remove the mechanical assembly.
2. Remove the paper bail assembly.
3. Remove the platen.
4. Remove the tractor feed assembly.
5. Remove the two screws that hold the pinch rollers in place **(Figure 2-22A)**.
6. Using a flat-blade screwdriver, gently pry the roller assembly free from the five tabs (located on both sides and on the front edge of the the assembly). The front tabs are between the roller assembly and the deflection plate. Pull up on the front section of the pinch roller assembly until the assembly is loose. It will not come all the way off because the wires from the paper-out sensor run down through the frame onto the sub PCB board.
7. Remove the connector from the sub PCB, freeing the roller assembly.
8. Lift the two pinch rollers and pinch-roller spring plates off the assembly.

Pinch Rollers

9. To remove the pinch rollers, push up on the small roller from underneath. The assembly will come out.

   Helpful Hint: Another method of getting the rollers out is to turn the assembly over, and move the rollers back and forth until they drop out.

Paper-Out Sensor

10. Turn the assembly over. (If you don't want the rollers to drop off, tape them onto the roller housing with scotch tape).
11. Gently lift out the three paper-out sensor wires from the cut outs on the roller housing **(Figure 2-22B)**.

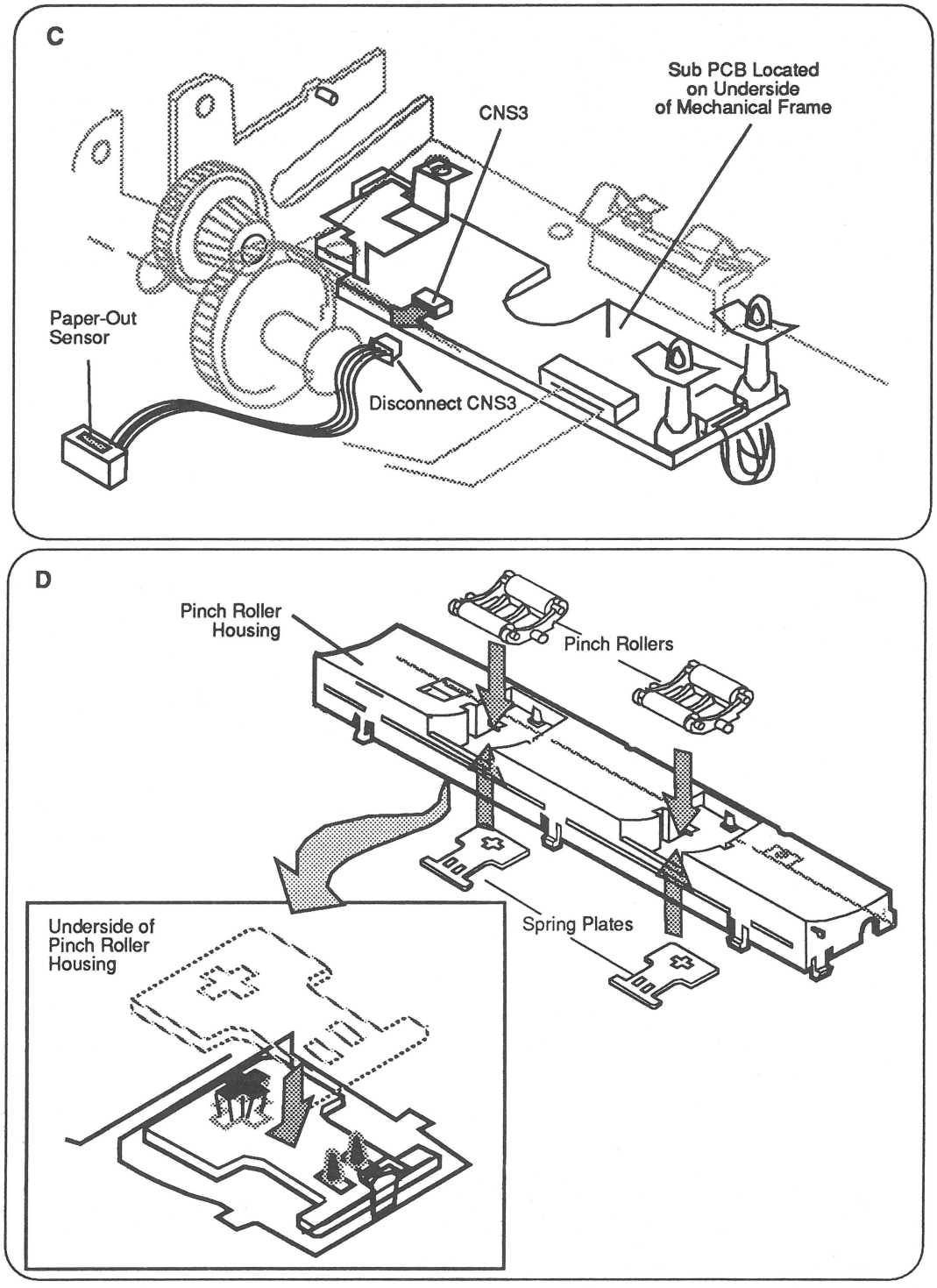

Figure 2-22 Pinch Roller Assembly (Continued)

12. Using a small flat-blade screwdriver, gently pry on the tabs retaining the switch in place, and at the same time lift on the switch until it comes out.

13. Detach the other end of the wires from connector CNS3 on the sub PCB **(Figure 2-22C)**. If you can't get at the connector, refer to the section on removing the sub PCB.

Replace

1. If the paper-out sensor has been removed, replace it by snapping it back into place **(Figure 2-22B)**.

2. Make sure that you align the three wires from the paper-out sensor with the cut outs on the bottom of the housing. Attach the connector to the sub PCB board connector CNS3.

3. Position the two pinch-roller spring plates **(Figure 2-22D)** on the pinch rollers.

   Note: Make sure that the spring plate on the bottom is attached to the + pin on the housing **(see detail in Figure 2-22D)**.

4. Position the pinch roller assembly so that the tabs line up with the holes on the frame. Gently press the pinch roller assembly into position.

5. Replace the two screws.

6. Replace the tractor feed assembly.

7. Replace the platen.

8. Replace the paper bail assembly.

9. Replace the mechanical assembly.

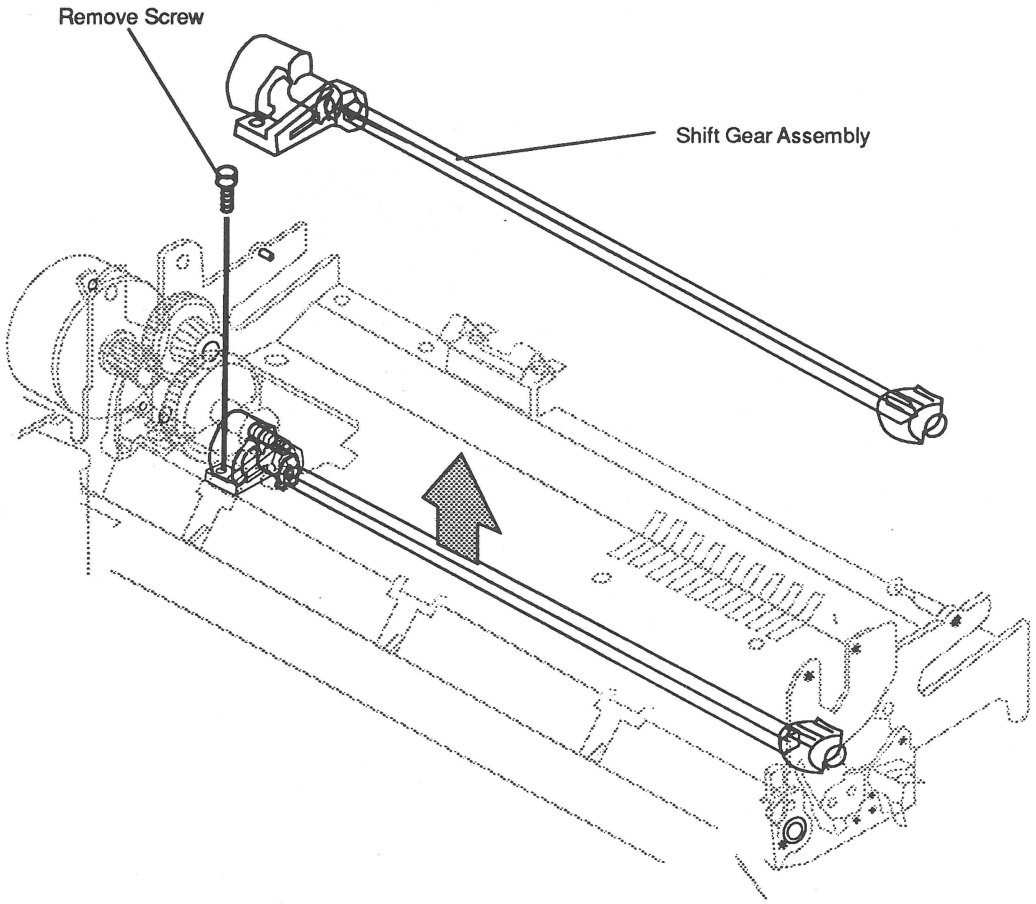

Figure 2-23 Shift Gear Assembly

❑ SHIFT GEAR ASSEMBLY

The shift gear assembly sits in the bottom of the mechanical assembly frame and helps transfer the motion of the paper lever so that either pin-feed or single-sheet paper drive can be selected.

Remove

1. Remove the mechanical assembly.
2. Remove the paper bail assembly.
3. Remove the tractor feed assembly.
4. Remove the pinch roller assembly.
5. Remove the one screw shown in **Figure 2-23** and lift the shift gear assembly from the frame.

Replace

1. Set the gear assembly into place and secure with the one screw.
2. Replace the pinch roller assembly.
3. Replace the tractor feed assembly.
4. Replace the paper bail assembly.
5. Replace the mechanical assembly.

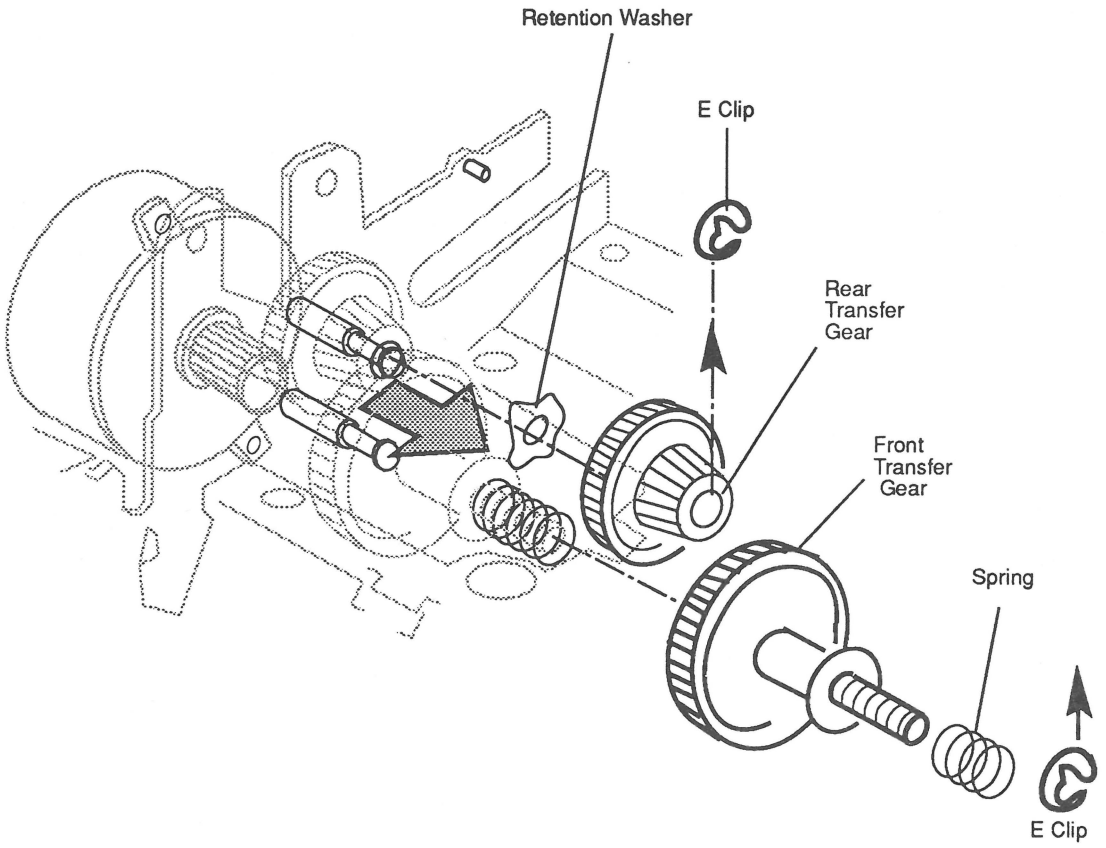

Figure 2-24 Transfer Gears

❑ TRANSFER GEARS

The two transfer gears are located on the left-rear side of the metal frame. Their function is to mesh with the paper feed motor gear and transfer the drive movement to the gears attached to the platen.

Remove

1. Remove the mechanical assembly.
2. Remove the paper bail assembly.
3. Remove the tractor feed assembly.
4. Remove the pinch roller assembly.
5. Remove the shift gear assembly.
6. Using a small screwdriver, a hook, or a small pair of needlenose pliers, remove the "E" clip from the large gear **(Figure 2-24)**. Be careful because the clip can jump off.
7. Slide the front transfer gear out.
8. Using the same tool as in step 6, remove the "E" clip from the smaller gear and slide the rear transfer gear off.

Replace

1. Replace the smaller of the two gears, and secure it with the "E" clip.
2. Replace the larger of the two gears and the spring. Secure them with the "E" clip.
3. Replace the shift gear assembly.
4. Replace the pinch roller assembly.
5. Replace the tractor feed assembly.
6. Replace the paper bail assembly.
7. Replace the mechanical assembly.
8. Perform the self test.

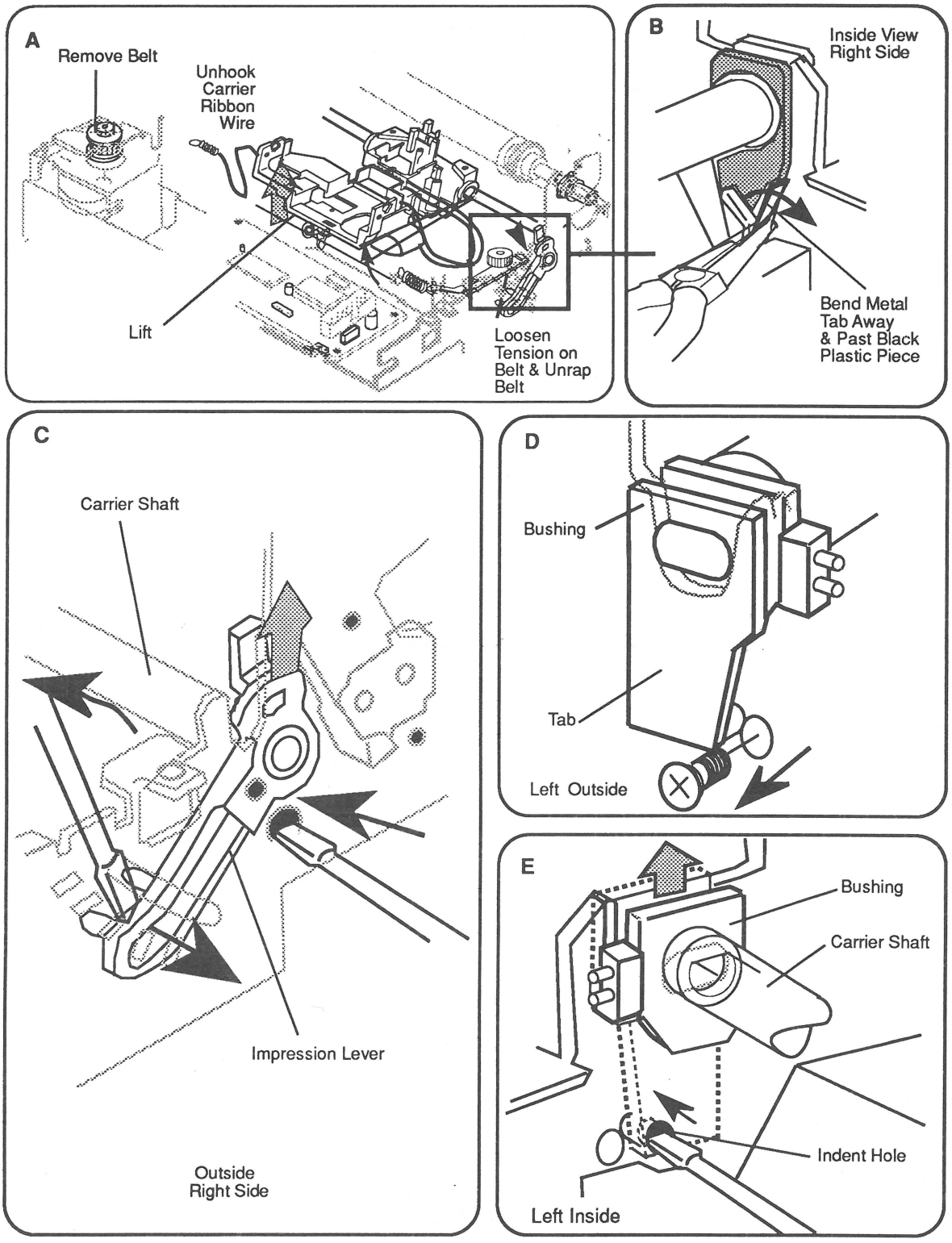

Figure 2-25 Carrier Assembly

❑ CARRIER ASSEMBLY

The carrier assembly includes the carrier housing, top plate, ribbon gear box, ribbon motor, ribbon detect switch, ribbon cam assembly, print head PCB, print head, paper guide, drive belt, and shaft.

Remove

1. Remove the mechanical assembly.
2. Remove the print head and paper guide.
3. Unhook the ribbon wire from both sides of the frame.
4. To remove the drive belt loosen the screw in the carrier pulley arm, and put a large screwdriver between the carrier pulley arm and the metal frame and push the screwdriver toward the right side. This action releases tension on the belt. Remove the drive belt from the right and left pulleys.
5. Move the carrier assembly to the right so that the right edge of the carrier housing is lined up with either the edge of the main logic PCB or the right edge of the platen. Lift up the front edge of the carrier assembly to remove it from the metal rail guide **(Figure 2-25A)**.
6. Look at **Figure 2-25B** for the connection of the right side of the carrier shaft to the frame. Using needlenose pliers, pry the metal finger that is part of the frame toward the front of the printer.
7. Gently insert a jeweler's flathead screwdriver into the hole on the right side of the frame **(Figure 2-25C)**. Gently push the tab backward, and lift the right side of the carrier shaft free but not all the way out.
8. On the left side, remove the screw from the motor side **(Figure 2-25D)**.

   Helpful Hint: It might be easier if you remove the line feed motor before you do the next step; however, it is not absolutely necessary.

Carrier Shaft

9. Insert a jeweler's flathead screwdriver into the hole on the left inside of the frame **(Figure 2-25E)**. Gently push the tab backward, and lift the left side of the carrier shaft free.

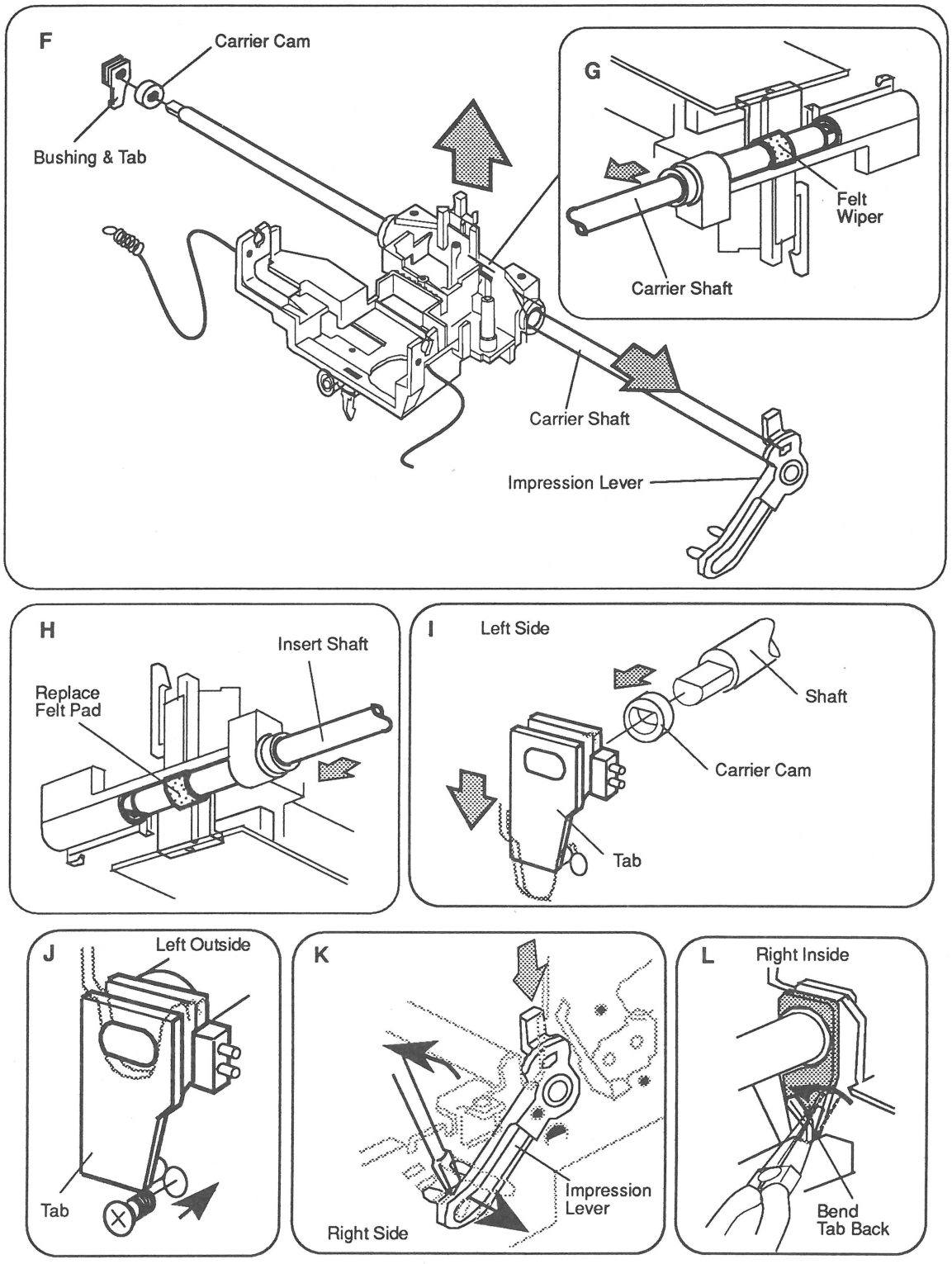

Figure 2-25 Carrier Assembly (Continued)

10. Remove the carrier cam (shaped like a washer) from the left side of the carrier shaft **(Figure 2-25F)**.

11. Turn the carrier assembly and the carrier shaft over. Slide the carrier shaft free of the carrier assembly. There is a felt wiper (for lubrication purposes) where the carrier shaft slides through the carrier assembly **(Figure 2-25G)**. Remove the shaft and the wiper.

Replace

1. Slide the carrier shaft through one end of the carrier assembly, replace the felt wiper, and slide the carrier shaft through the other side of the carrier assembly **(Figure 2-25H)**.

2. Place the carrier cam on the left side of the carrier shaft. Be sure to position it as shown in **Figure 2-25I**, with the flat section at the top of the cam. The wrong position will produce uneven printing.

IMPORTANT: *For even printing intensity, be sure to position the carrier cam with the flat section at the top of the cam.*

3. Insert the left side of the shaft into the plastic bushing.

4. Position the carrier assembly so the tabs underneath the assembly are in place.

5. Push back the tab **(Figure 2-25J)**, and slide the left side of the carrier shaft into place while making sure the right side is lined up.

6. Replace the screw that secures the tab.

CAUTION: *In order for the carrier assembly to work properly, the alignment of the carrier shaft is critical.*

7. Slide the right side of the carrier shaft into position, making sure that the tab is in the hole in the metal frame and that the impression lever is in position **(Figure 2-25K)**.

8. Push the metal finger back toward the rear of the machine **(Figure 2-25L)** so it covers the black plastic piece.

9. Replace the carrier drive belt.

10. Replace the ribbon wire. If the wire has slipped off the ribbon gear box pulley, refer back to the section "Ribbon Gear and Wire Assembly."

11. Replace the print head and paper guide.

12. Replace the mechanical assembly.

13. Perform the self-test.

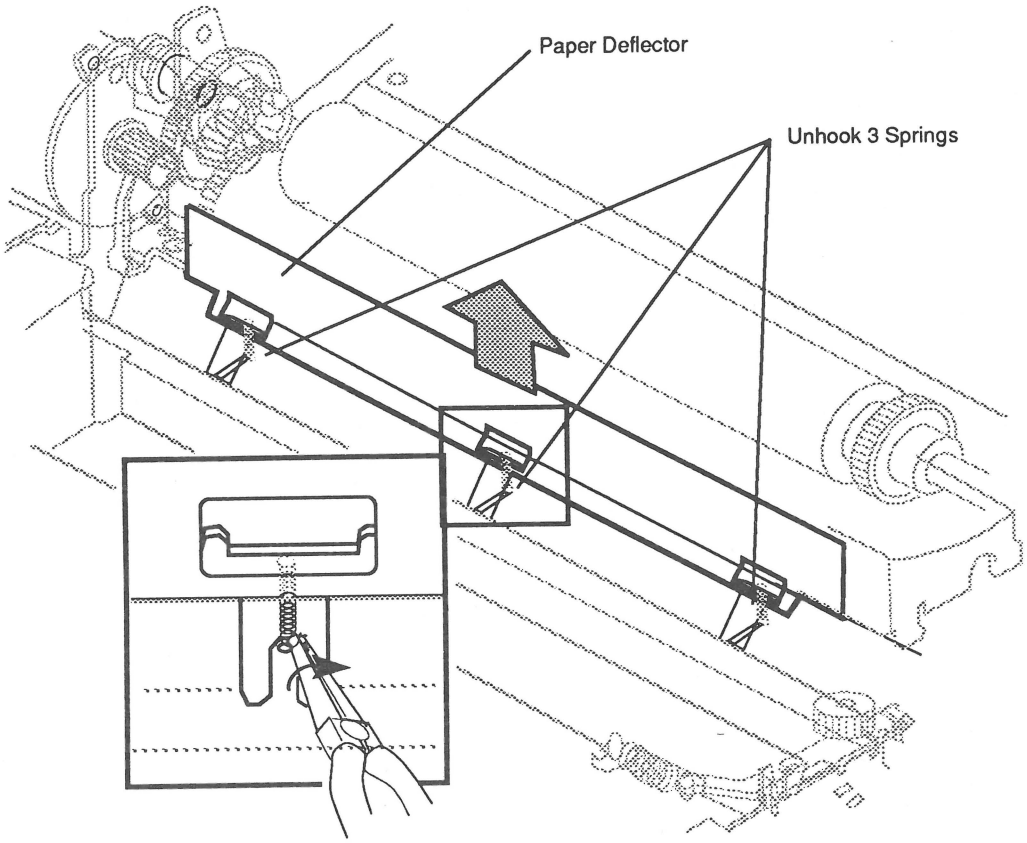

Figure 2-26 Paper Deflector

❑ PAPER DEFLECTOR

The paper deflector is the long thin metal piece that sits between the plastic paper roller guide assembly and the carrier assembly. The paper deflector is attached to the metal frame.

Remove

1. Remove the carrier assembly.
2. Unhook the three springs **(Figure 2-26)** that hold the paper deflector to the frame.

Replace

1. Attach the three springs to the paper deflector.
2. Hold the deflector in position **(Figure 2-26)** and attach the springs to the hooks on the metal frame.
3. Replace the carrier assembly.
4. Perform the self test.

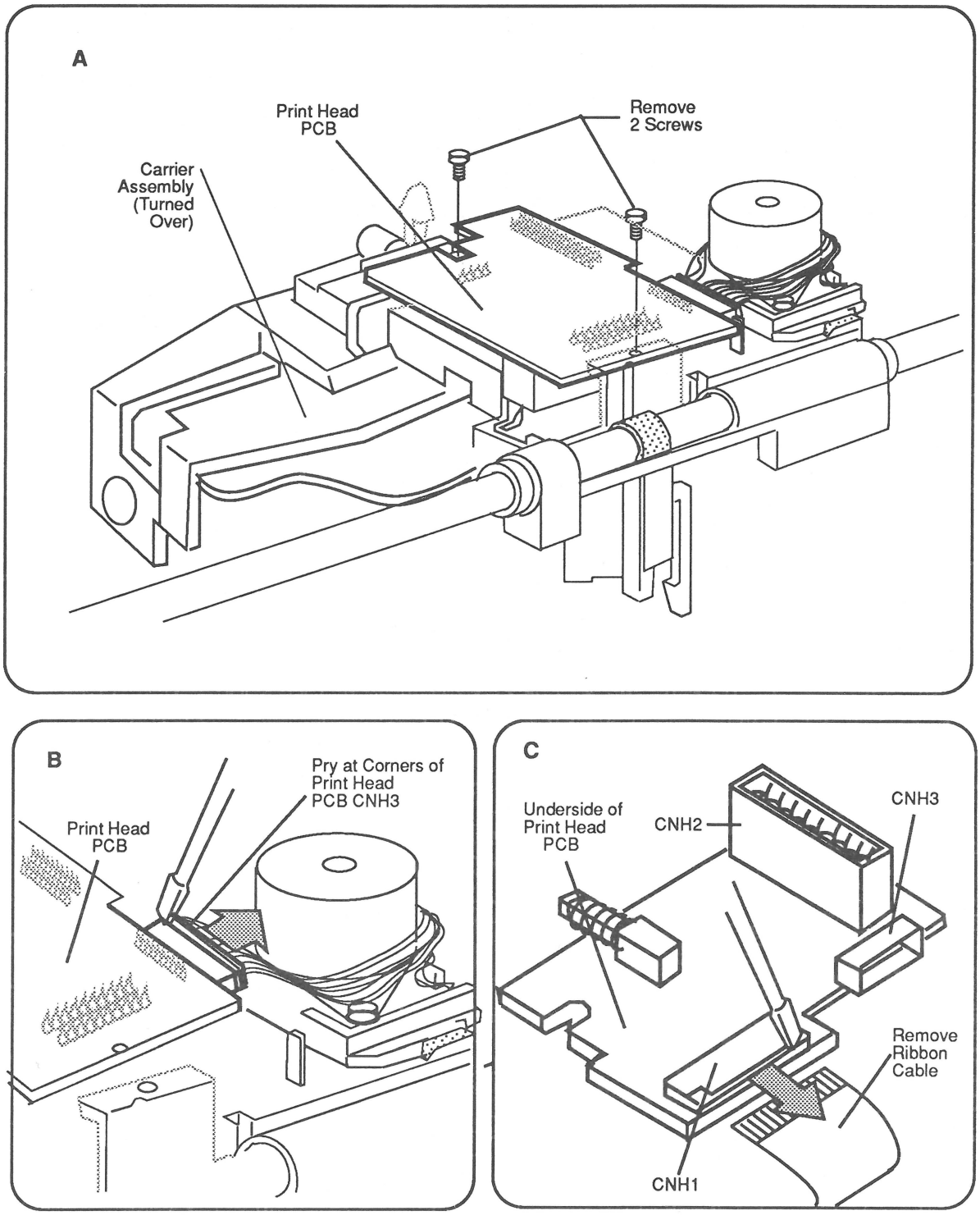

Figure 2-27 Print Head PCB

❑ PRINT HEAD PCB

The print head PCB is located underneath the carrier housing. The ribbon cable from the main logic board and the ribbon motor are connected to it. The print head PCB also contains the print head connector and the home position switch.

Remove

1. Remove the carrier assembly.
2. Remove the shaft and flip the carrier over.
3. Remove the two screws holding the print head PCB in place **(Figure 2-27A)**.
4. Gently lift the side of the board **(Figure 2-27B)** and pry it away from the ribbon motor connector CNH3 to disconnect the board.
5. Lift the board so that you can turn it over to the component side. Disconnect the ribbon cable from connector CNH1 **(Figure 2-27C)**, and remove the board.

Replace

1. Replace the ribbon cable into CNH1 **(Figure 2-27C)**.
2. Position the PCB over the housing (component side down) and slide the connector CNH3 into the wire connector from the ribbon motor **(Figure 2-27B)**.
3. Replace the two screws that hold the print head PCB in place **(Figure 2-27A)**.
4. Replace the carrier assembly.

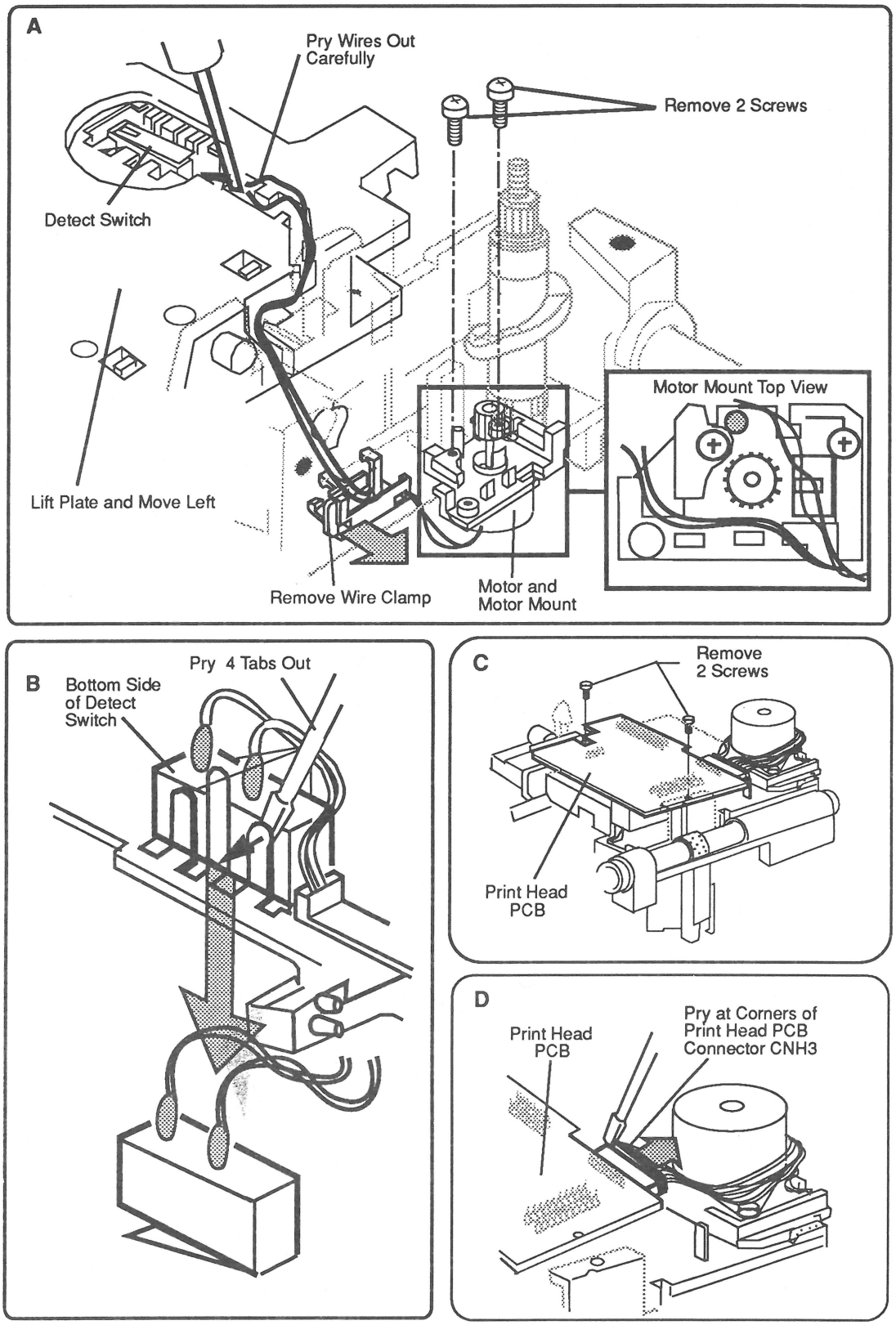

Figure 2-28 Ribbon Motor and Detect Switch

❑ RIBBON MOTOR AND COLOR RIBBON DETECT SWITCH

The ribbon motor and ribbon detect switch are a single assembly. They are removed and replaced together. The common point between the ribbon motor and the ribbon detect switch is the wire connector that is plugged into the print head PCB.

Remove

1. Remove the carrier assembly.
2. From the top side of the carrier assembly, remove the two screws that hold the motor in place **(Figure 2-28A)**.
3. Remove the wire clamp bracket from the side of the carrier assembly.
4. Carefully work the two wires out from under the wire holders on the top plate.
5. Flip the carrier assembly over and remove the detect switch from the top plate **(Figure 2-28B)**.
6. Remove the two screws holding the print head PCB **(Figure 2-28C)**.
7. Tilt the print head PCB and pry out the connector from the ribbon motor **(Figure 2-28D)**.
8. Pull out the ribbon motor.

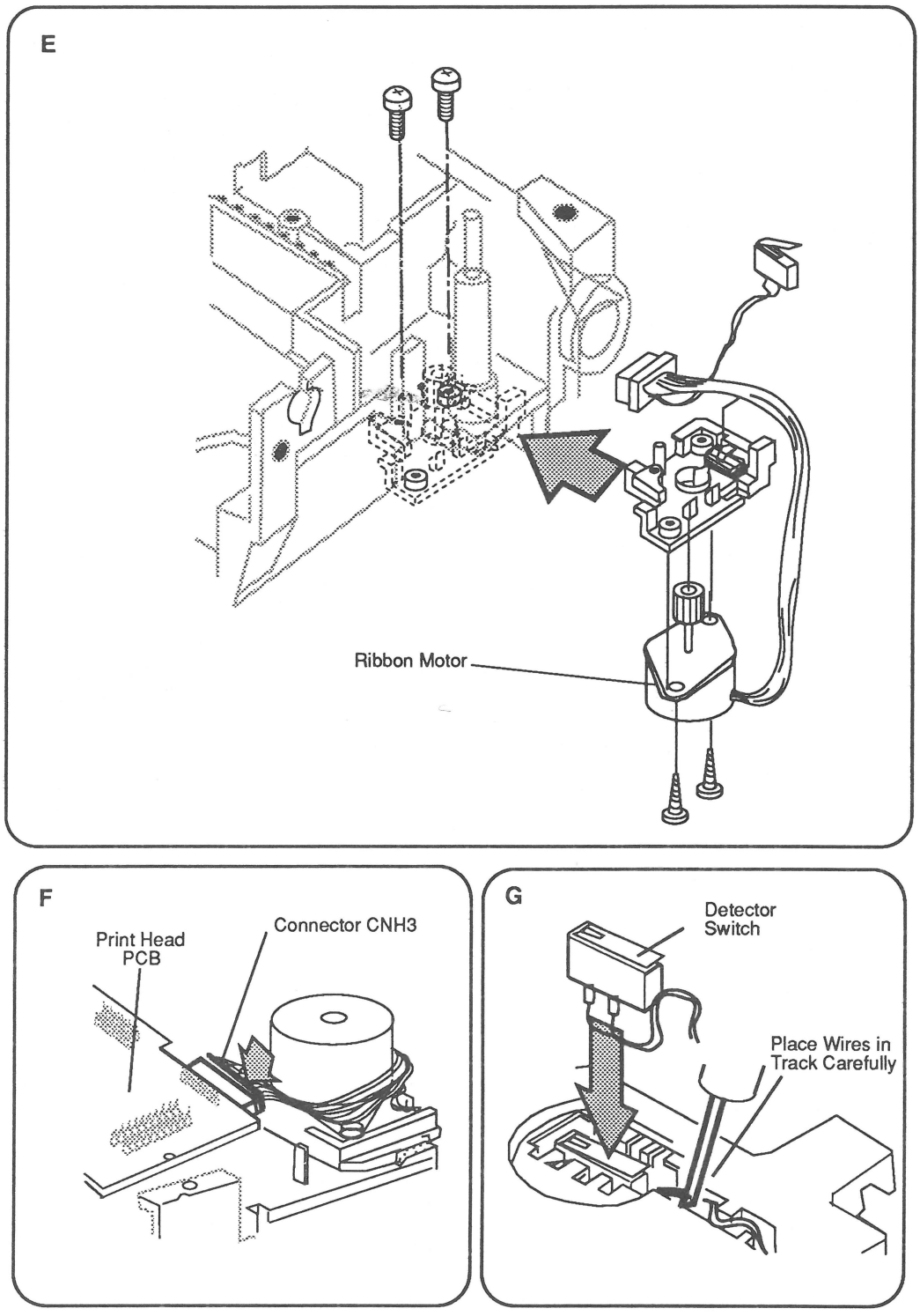

Figure 2-28 Ribbon Motor and Detect Switch (Continued)

Replace

1. Slide the ribbon motor into position **(Figure 2-28E)**.

2. Connect the ribbon motor connector to the connector CNH3 on the print head PCB **(Figure 2-28F)**.

3. Replace the two screw in the print head PCB.

4. Flip the assembly over to the top side, and replace the two screws that hold the motor in place **(Figure 2-28E)**.

5. Align the ribbon detect switch over the opening in the carrier top plate and push the switch down into position until you hear, or feel, it snap into position **(Figure 2-28G)**.

6. Run the wires along the channel on the top plate and insert them into the channel under the tabs. Be careful not to bend the tabs out too far.

7. Replace the plastic bracket, which holds the wires in place along the side of the carrier assembly.

8. Replace the carrier assembly.

9. Perform the self-test.

Apple Technical Procedures

ImageWriter II/L

Section 3 – Troubleshooting

❑ CONTENTS

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3.2	Before You Start
3.2	How to Use the Symptom Table
3.3	How to Use the Flowcharts
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3.6	Symptom Table
3.6	Print Quality Problems
3.7	Carriage Movement Problems
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❑ INTRODUCTION

Before You Start

Read the section entitled "Things to Check" before you begin troubleshooting. **You need the information in that section to troubleshoot the ImageWriter II/L effectively.**

If the suggestions in "Things to Check" do not correct a problem, run the self-test (see Section 1, Basics).

How to Use the Symptom Table

To use the symptom table, first find the symptom that most nearly describes the problem; then perform the first corrective action on the solution list. If that corrective action does not fix the problem, go to the next action. **If you replace a module and find that the problem remains, reinstall the original module before you go on to the next action.**

If the symptoms displayed by the ImageWriter II/L are not listed in the symptom table, or if the system is not displaying a clearly defined problem, use the flowcharts.

How to Use the Flowcharts

To use the flowcharts, examine the printer for the symptoms listed below, and then turn to one of the seven troubleshooting flowcharts for instructions. If the flowchart asks you to make a replacement or an adjustment, look up the procedure in the table of contents in Section 2, Take-Apart, or Section 4, Adjustments.

Note: Some of the flowcharts have you use a multimeter to check resistance and continuity on some replaceable parts and modules. If you do not know how to use the multimeter, you will have to exchange the part in question to verify that the customer's part is bad.

Indication	Flowchart
Power Light Not Lit	1
Power Light On, No Printing (Does Not Run Self-Test)	2
Power Light On No Printing (Continued)	2A
No Paper Feed (Power Light On)	3
Ribbon Color Selection Fails Self-Test	4
Print Quality Problems (Poor Quality, No Print, or Dots Missing)	5
Option Card Malfunctioning	6
Final Test	7

On the pages preceding each flowchart are notes with additional instructions and references.

Starting at the top of a flowchart, answer the questions and proceed down the chart. When you arrive at a rectangular box containing a list of actions, perform the actions in the sequence listed. On completion, return to the preceding diamond box. **If the problem remains, reinstall the original module before you go on to the next action.**

❑ THINGS TO CHECK

There are many problems that have simple corrections listed on the following chart. It will save you time in the long run if you try these remedies before you begin troubleshooting.

Note: If an option card is installed, remove it before you begin. Then verify that DIP switch SW2-4 is open/off.

Symptom	Check
• *Error light blinks*	1. Verify that the paper cover is securely in place. 2. Verify that the paper cover magnet is in place. 3. Possible left-margin error occurs while printing. Try other software. 4. Option card is not installed and DIP switch SW2-4 is closed/on.
• *Select light off, error light on*	1. Verify that paper is present and properly inserted. 2. Verify that the paper-out sensor is working correctly (see Section 2, Take-Apart).
• *Select light does come on*	1. Verify that the paper cover is securely in place. 2. Verify that the paper cover magnet is in place. 3. Verify that the operation cable under top cover is secure.
• *No printing or garbled printing*	1. Verify that the interface cable between the printer and the computer is tightly connected. 2. Verify that DIP switches (SW2-1 through SW2-4) are properly set (see Section 1, Basics).
• *Software-specific problem*	– Try a known-good piece of software.
• *Prints OK for a while, then prints garbage*	– Set DIP switch SW2-3 to the correct serial protocol (see Section 1, Basics).

Symptom	Check
• *Overprinting*	– Verify that the program being used is set for the correct line spacing and line length.
• *Light printing*	1. Change the ribbon cartridge. 2. Adjust the impression lever (see Section 4, Adjustments). 3. Check for excessive play in the carrier assembly. Make sure the assembly is seated correctly (see Section 2, Take-Apart).
• *Erratic carrier motion, loud hum*	– Remove the black tube-shaped shipping protection from the carrier shaft.
• *Printing has squashed lines; misregistration problems when using pin feed paper*	1. For the best print quality, instruct the customer to place the stack of paper behind the printer, and no more than three feet below the printer. The paper should have a clear, unobstructed entry and exit path. 2. Verify that the power cord or printer cable does not obstruct the paper path. 3. Avoid printing in the top and bottom one inch of the paper (the areas where the squashed line and misregistration problems will be the most apparent). 4. Use 20-pound paper.

❑ SYMPTOM TABLE

Print Quality Problems	Solutions
• *Compressed first or second line when printing*	1. Check the position of the paper behind the printer to ensure there isn't anything blocking the paper entry or exit. 2. Replace the main logic board.
• *Print is darker or lighter on one side*	– Refer to Section 3, Take-Apart, for removing and installing shims.
• *Top row of dots missing on printout*	– Perform "Ribbon Adjustment" (refer to Section 4, Adjustments).
• *When printing from a Macintosh, characters sometimes appear smudged, or the top of form gradually creeps down the page in one-line increments*	– Verify that the ImageWriter II/L driver software is the most current version. If it is not, run the most current Installer program and use the Chooser to select the ImageWriter as the print driver.
• *Power light on, no printing*	1. Verify that the ribbon frame assembly is riding on the spiral ridge on the color ribbon cam (see Section 4, Adjustments). 2. Remove the dot head and verify that the pins in the connector on the dot head PCB are not bent. 3. Go to Troubleshooting Flowchart 2.
• *Missing dots*	1. Verify that the flexible cable is connected properly. 2. Remove the dot head and verify that the pins in the connector on the dot head PCB are not bent. 3. Go to Troubleshooting Flowchart 5.
• *Color self-test does not work*	1. Verify that the color ribbon detect switch is operating and the wires are unbroken. Replace the switch, if defective. 2. The top plate of the carrier assembly (under the ribbon cartridge) is not properly engaged with the color ribbon cam (see Section 2, Take-Apart, or Section 4, Adjustments).

Carriage Movement Problems	Solutions
• *Carriage doesn't move; LEDs are not lit*	1. Replace the main logic board. 2. Replace the power supply PCB.
• *Carriage doesn't move; LEDs are lit*	1. Replace the main logic board. 2. Replace the power supply PCB.
• *Carriage assembly moves to the left and does not return to center*	1. Verify the operation of the switch on the print head PCB. If the switch is frozen or defective, replace the print head PCB. 2. Verify that the metal tab actuating the left-side home position switch is bent correctly. Use a feeler gauge and bend the tab 1 mm toward the right side. 3. Replace the main logic board. 4. Replace the print head PCB. 5. Replace the flexible ribbon cable.
• *Carriage moves to the left and hums very loudly*	1. Verify that the flexible ribbon cable is properly connected to the main logic board and to its connector under the carriage assembly on the print head PCB. 2. Replace the flexible ribbon cable. 3. Replace the print head PCB.
• *Self-test produces no carrier movement (LEDs are lit)*	1. Remove the mechanical assembly to ensure that the wires to the carrier motor are not pinched. If wires to the carrier motor are worn, replace them. 2. Replace the fuse on the main logic board. 3. Replace the main logic board.
• *Carriage assembly grinds or is hard to move*	1. Replace the fuse on the main logic board. 2. Replace the power supply PCB.
• *Carrier binds on left side*	– The paper guide is too close to the platen. Readjust the paper guide.

• *Carrier intermittently locks up and gives light or dark print*	– Verify that the rear of the carrier assembly does not lift up. If it does, it is not seated correctly in the guide rail. Gently push down on the rear of the carrier assembly until it snaps into place.

Paper Feed Problems	**Solutions**
• *Grinding during paper feed*	1. Remove the platen knob to verify that there are no obstructions in the gearing beneath the knob. 2. Adjust the paper guide (refer to Section 4, Adjustments). 3. Replace the line feed motor. 4. Replace the main logic board.
• *Paper adjustment lever does not move*	– Verify that the power on/off cable is not pinched between the lever and the metal frame or the plastic case.

Miscellaneous Problems	Solutions
• *Hexadecimal data is printed*	– Power the printer off and then on.
• *Power supply goes bad repeatedly*	– Verify that the power supply and motor wires are not pinched. If the wires are pinched, lift out the mechanical assembly and reposition the wires.
• *Ribbon jams or does not advance*	1. Check the gear box on the carrier assembly. Verify that the gear with the cross (+) (see Section 2, Take-Apart) is sticking up through the carrier assembly top plate and engages the ribbon cartridge. 2. Verify that the ribbon wire is properly installed in the gear box (see Section 2, Take-Apart). 3. Verify that the print head wires are not striking the platen too hard. If they are, replace the main logic board. If this does not correct the problem, reinstall the original main logic board and replace the print head.

❑ IMAGEWRITER II/L FLOWCHARTS

Notes for Flowchart 1: Power Light Not Lit

1. To check the operation panel:

   a) Set the digital multimeter to measure continuity.

   b) Remove the top cover.

   c) Check the switches by measuring them at the connector on the bottom of the operation panel PCB as shown in **Figure 3-1**.

   d) As you put the probes on the points, depress the corresponding switch.

   e) When the switch is depressed, the meter should indicate continuity.

   f) When the switch is pressed again, the meter should indicate **open**.

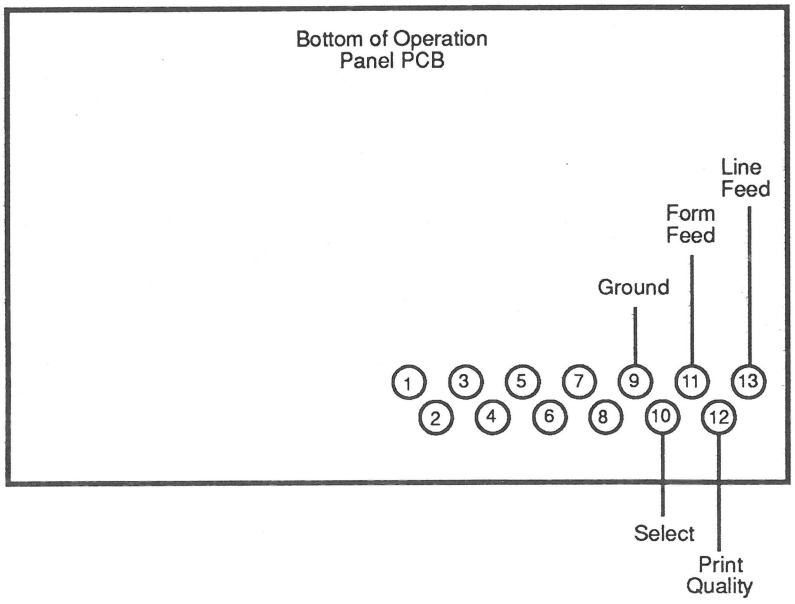


Figure 3-1

2. To check the fuse (printer should be off):

   a) Set the digital multimeter to measure continuity.

   b) Using a fuse puller, remove fuse FU1 from the main logic board.

Notes for Flowchart 1 (continued)

c) Using the meter, check the fuse.

d) The fuse should have continuity. If the meter indicates **open**, replace the fuse.

3. Measure the DC voltages at CN3, the connector to the main logic board. Measure the voltages with power applied to printer.

   a) Set the meter to measure DC voltage. Use a range of 30 volts DC or greater.

   b) Put the common probe on pin 4 of the connector as shown in **Figure 3-2**. Measure the following voltages on each pin:

   Pin 2 = +5 VDC
   Pin 3 = -5 VDC
   Pin 5 = +26 VDC (motor voltage)

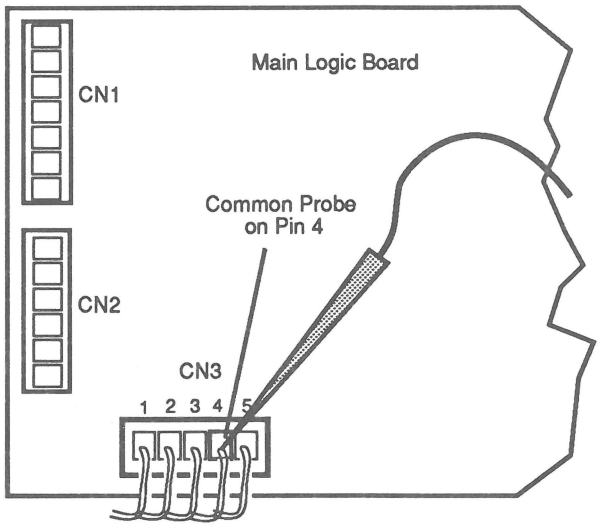


FIGURE 3-2

Notes for Flowchart 1 (continued)

4. If any of the voltages checked in note 3 is incorrect, switch off the printer and do the following:

   a) Remove the mechanical assembly.

   b) Using a fuse puller, remove fuses FU1 and FU2 from the power supply board (see Section 2, Take-Apart).

   c) Set your meter to read continuity.

   d) Use the meter to check the fuses for continuity. Replace any fuse that indicates **open**.

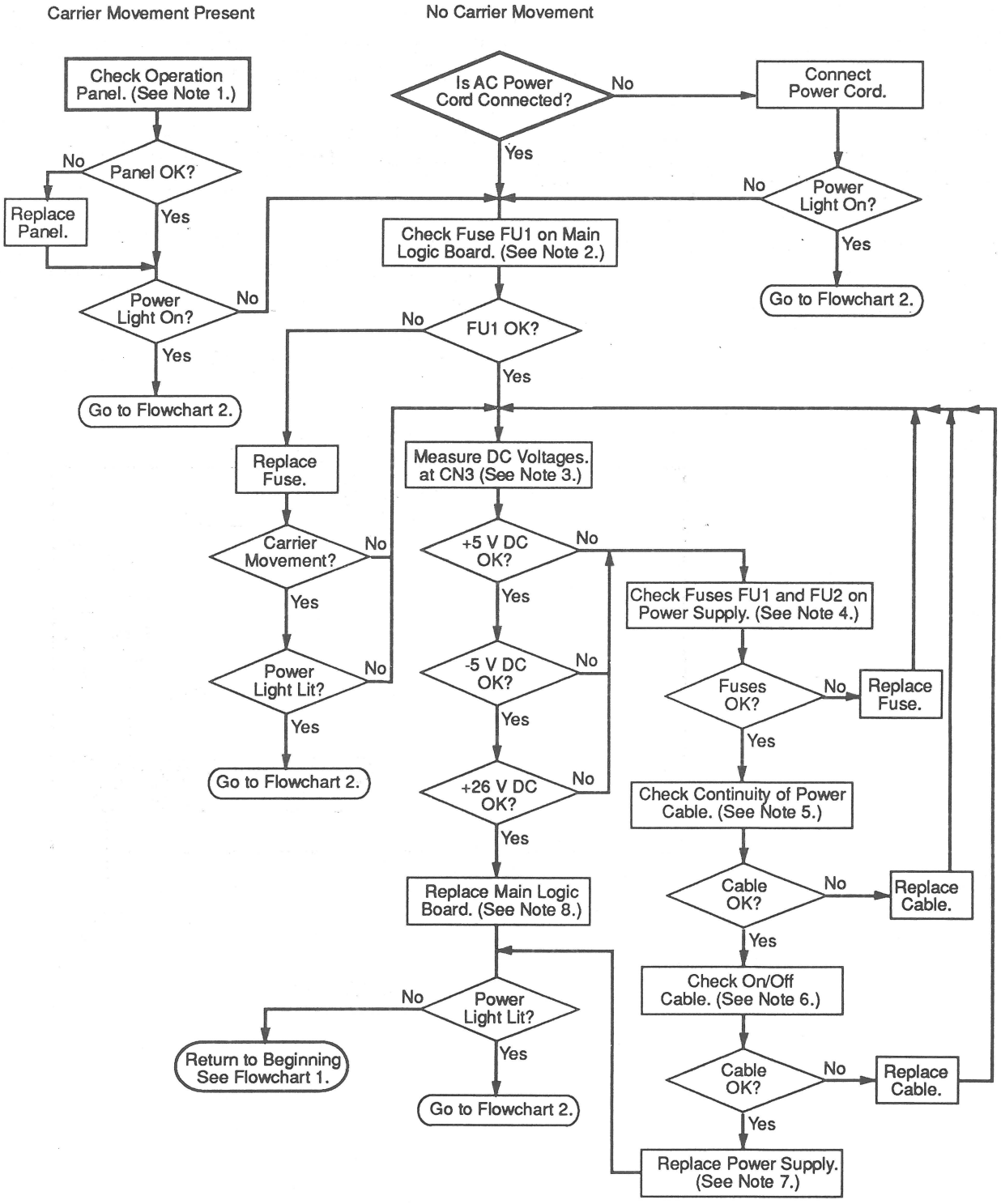
5. Remove the DC power cable between connector CNS2 (on the power supply board) and CN3 (on the main logic board). Check the cable wires for continuity between the connectors. If any of the cable wires indicates **open**, replace the cable.

6. Check the power on/off cable. This cable works just like an actuation cable on a camera. As you press the power switch down, the cable inside slides through the outer cable housing and presses against a switch mounted on the power supply board. Make sure the cable is working and that the switch on the board is being activated. If the cable is defective, replace it.

7. See Section 2, Take-Apart, for power supply replacement.

8. See Section 2, Take-Apart, for main logic board replacement.

Flowchart 1
Power Light Not Lit



Notes for Flowchart 2: Power Light On, No Printing, Does Not Run Self-Test

1. To check the form feed switch on the operation panel (printer should be off):

   a) Set the multimeter to measure continuity.

   b) Remove the top cover (see Section 2, Take-Apart).

   c) Flip over the top cover so that the bottom of the operation panel PCB is facing up.

   d) Place the probes on pins 9 and 11, which are shown in **Figure 3-3**. The meter should indicate **open**.

   e) Depress the form feed switch. The reading should indicate continuity. If the meter does not indicate continuity, replace the operation panel PCB.

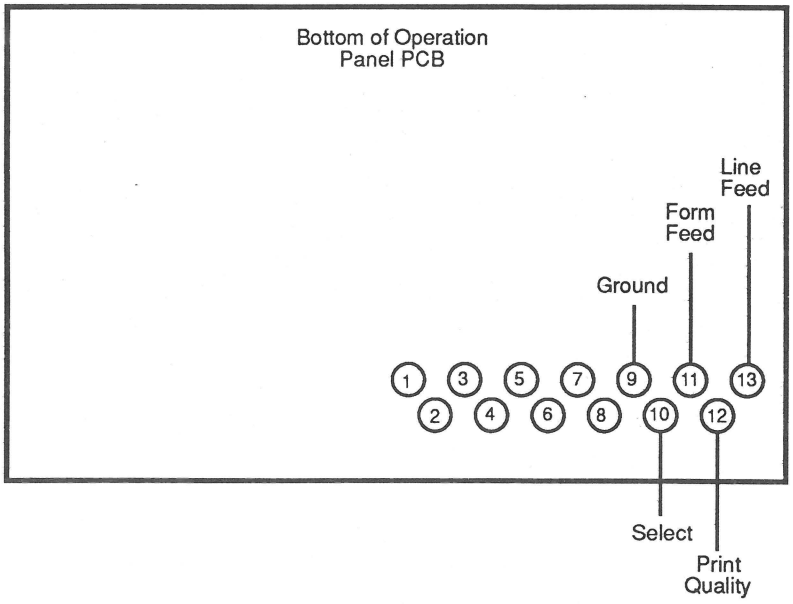


Figure 3-3

Notes for Flowchart 2 (continued)

2. To check the home position switch and the flexible ribbon cable to the head PCB:

   a) Detach the flexible ribbon cable from connector CN5 on the main logic board.

   b) Locate the home position switch (under the left side of the ribbon carrier on the head PCB).

   c) Set the digital multimeter to measure continuity.

   d) Place the probes on pin 14 and pin 19 on the flexible cable **(Figure 3-4)**.

   Note: The pins on this ribbon cable are exposed only on one side, and pin one is on the right side. It is easier to make this measurement if you have someone or an electronics clamp hold the cable.

   e) Push the home position switch on the head PCB. The reading should indicate continuity when the switch is depressed. When the switch is released, the reading should indicate **open**.

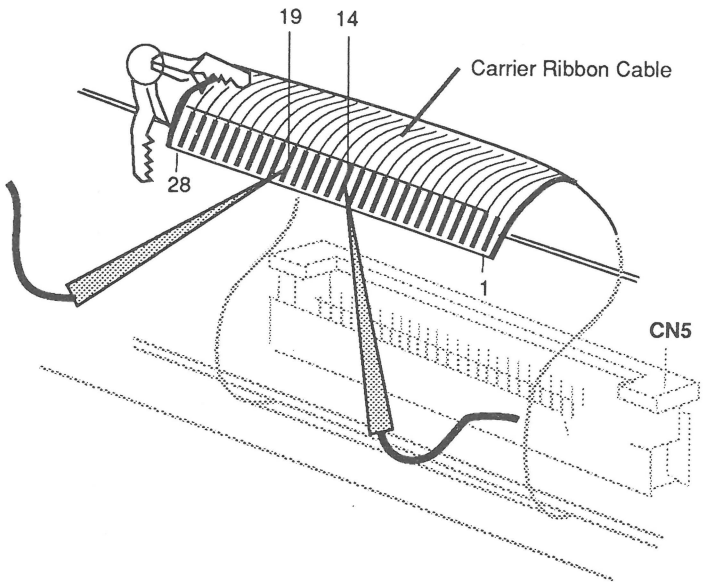


Figure 3-4

Notes for Flowchart 2 (continued)

3. Detach the ribbon cable from connector CNH1 (under the print head PCB) and CN5 (on the main logic board). Check the cable for continuity by doing the following:

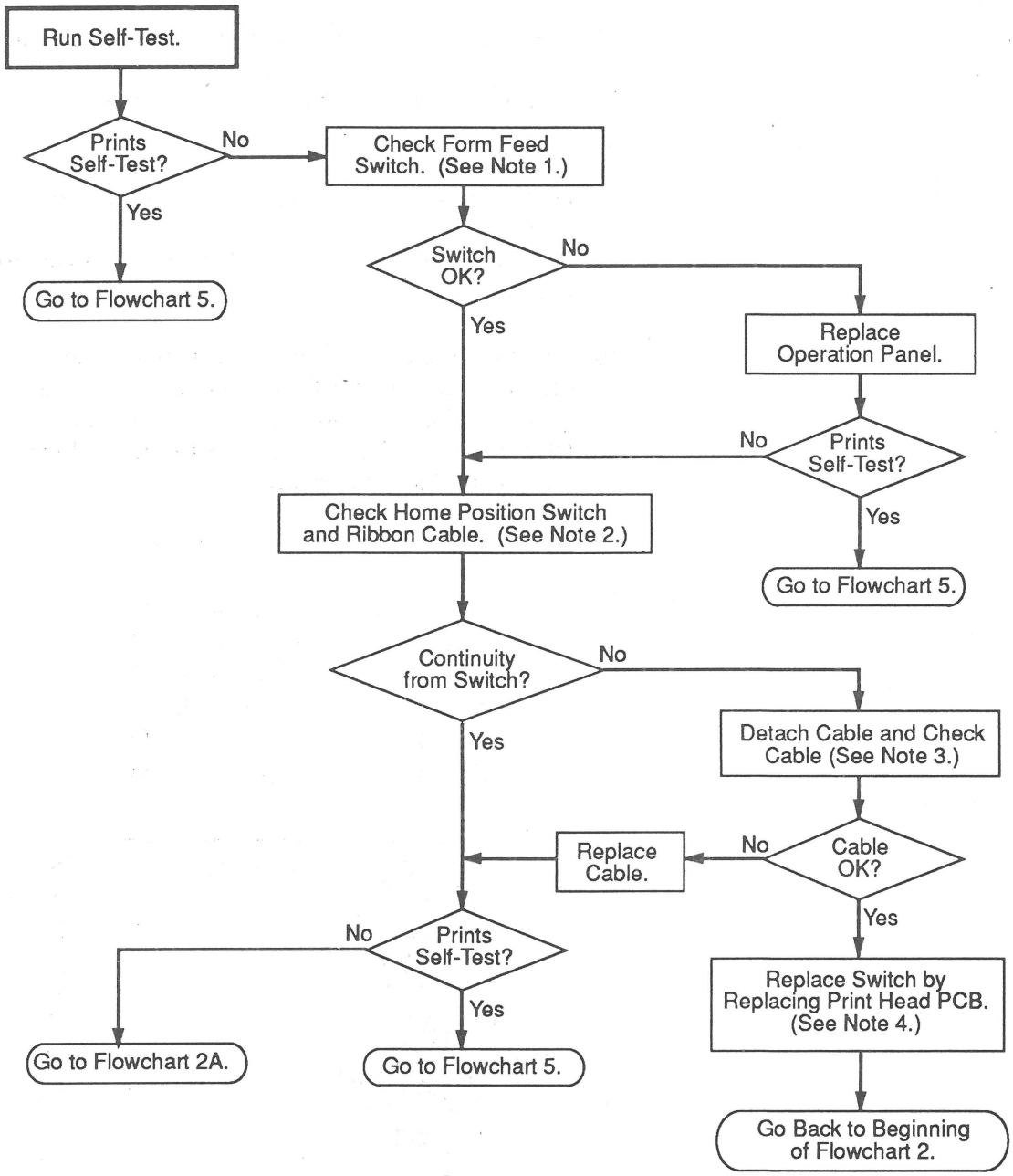
   a) Set your meter for continuity.

   b) Test cable wires 14 and 19 from end to end for continuity. If either wire indicates **open**, replace the cable.

4. In order to replace the home position switch, you must replace the print head PCB (see Section 2, Take-Apart for correct removal procedures).

Flowchart 2

Power Light On, No Printing, Does Not Run Self-Test



Notes for Flowchart 2A: Power Light On, No Printing, Does Not Run Self-Test

1. Manually move the carrier back and forth. If it will not move, do the following:

   a) Check the ribbon cartridge to be sure the ribbon winds when the knob is turned in the direction of the arrow.

   b) Check the carrier shaft and carrier belt for damage and foreign materials.

   c) Check the ribbon wire for dislocation and damage.

   d) Perform carrier shaft maintenance (see Section 1, Basics).

2. To check the carrier motor, do the following:

   a) Remove wire connector CN2 from the main logic board.

   b) Set your meter to measure approximately 0–10 ohms. Confirm the following resistance values between the pins on the wire connector **(Figure 3-5)**. If any of the resistance values is wrong, replace the motor.

Pins	Approx. Ohms
1 & 6	3.1 Ω — 3.8 Ω
3 & 6	3.1 Ω — 3.8 Ω
2 & 5	3.1 Ω — 3.8 Ω
4 & 5	3.1 Ω — 3.8 Ω
1 & 3	6.3 Ω — 7.7 Ω
2 & 4	6.3 Ω — 7.7 Ω

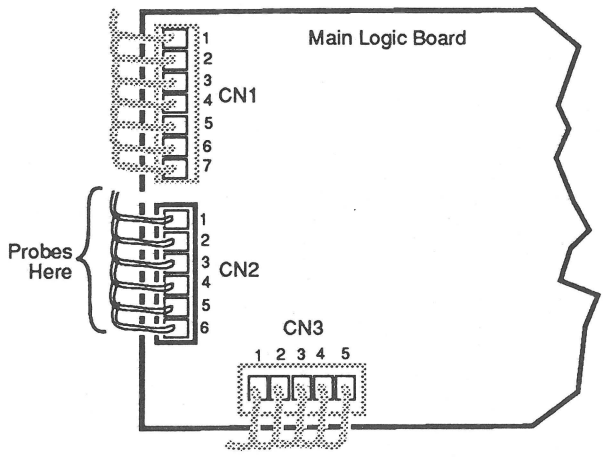
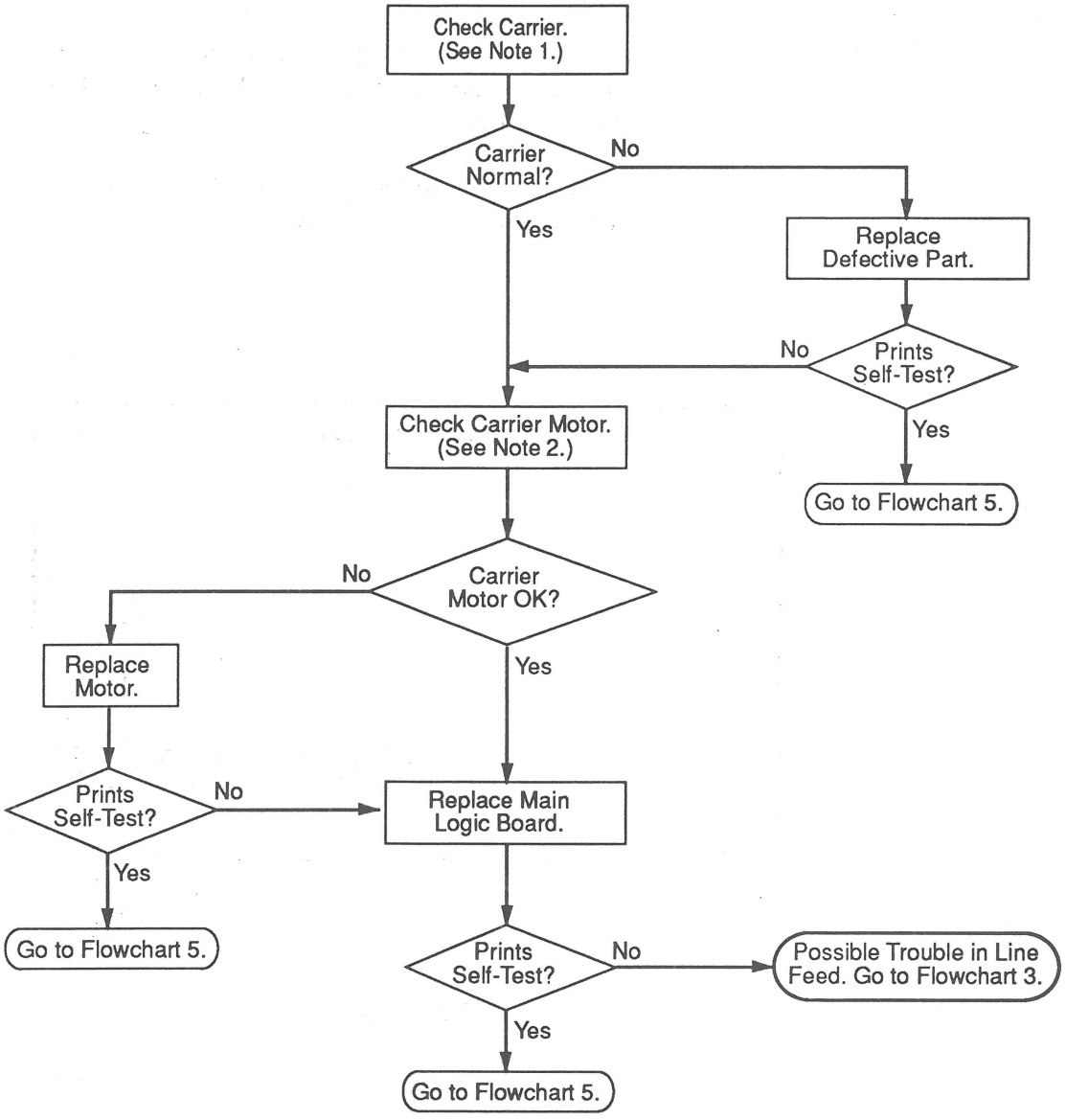


Figure 3-5

Flowchart 2A

Power Light On, No Printing, Does Not Run Self-Test



Notes for Flowchart 3: No Line Feed, Paper Light On

1. To check the line feed mechanism, insert paper and turn the platen knob. Make sure the gears to the left of the platen mesh properly.

2. To check the form feed and line feed switches on the operation panel (printer should be off):

   a) Set the digital multimeter to measure continuity.

   b) Place the probes on pin 9 and pin 11 of the operation panel connector **(Figure 3-6)**. The reading should indicate **open**.

   c) Depress the form feed switch. The reading should indicate continuity.

   d) Place the probes on pin 9 and pin 13 of the operation panel connector. The reading should indicate **open**.

   e) Depress the line-feed switch. The reading should indicate continuity.

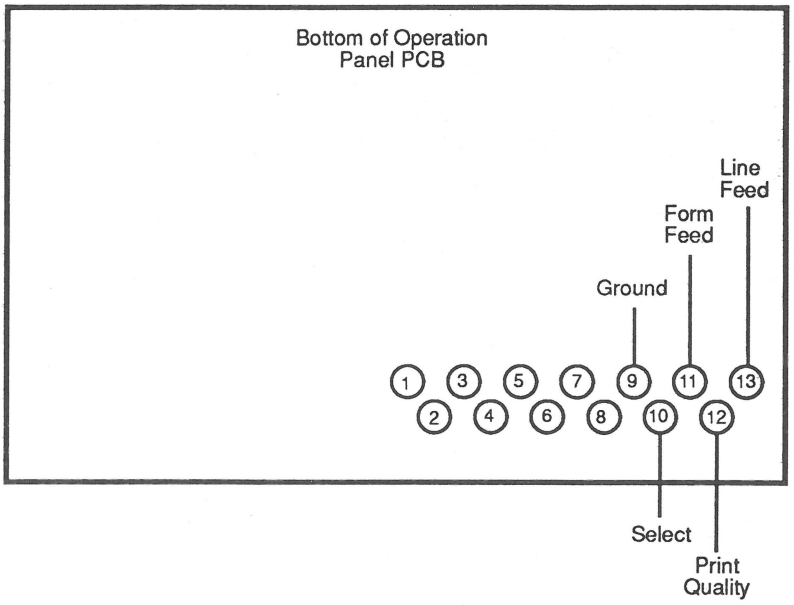


Figure 3-6

Notes for Flowchart 3 (continued)

3. To check the operation panel ribbon cable:

   a) Remove the cable from the connector on the operation PCB.

   b) Measure all the cable wires for continuity from end to end **(Figure 3-7)**.

   c) If any of the wires indicates **open**, replace the cable.

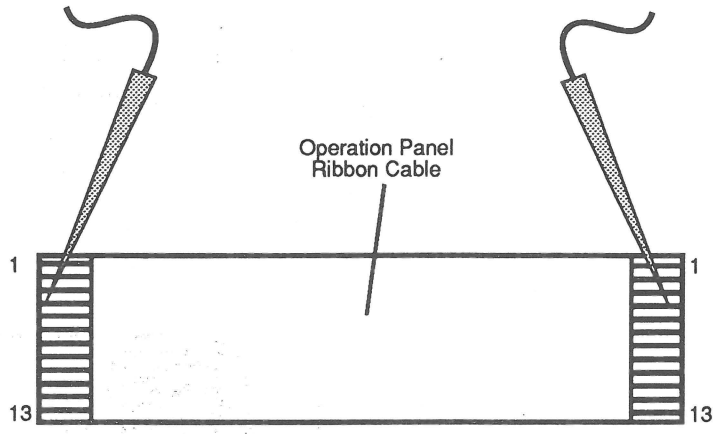


Figure 3-7

4. To check the line feed motor (printer should be off):

   a) Set the digital multimeter to measure 200 ohms resistance.

Notes for Flowchart 3 (continued)

b) Disconnect the cable at connector CN1 on the main logic board. You should find the following resistance values on the pins **(Figure 3-8)** inside the cable connector:

Pins	Approx. Ohms
1 & 5	19.8 Ω — 24.2 Ω
3 & 5	19.8 Ω — 24.2 Ω
2 & 6	19.8 Ω — 24.2 Ω
4 & 6	19.8 Ω — 24.2 Ω
1 & 3	39.6 Ω — 48.4 Ω
2 & 4	39.6 Ω — 48.4 Ω

c) If any of the above values is not correct, replace the line feed motor.

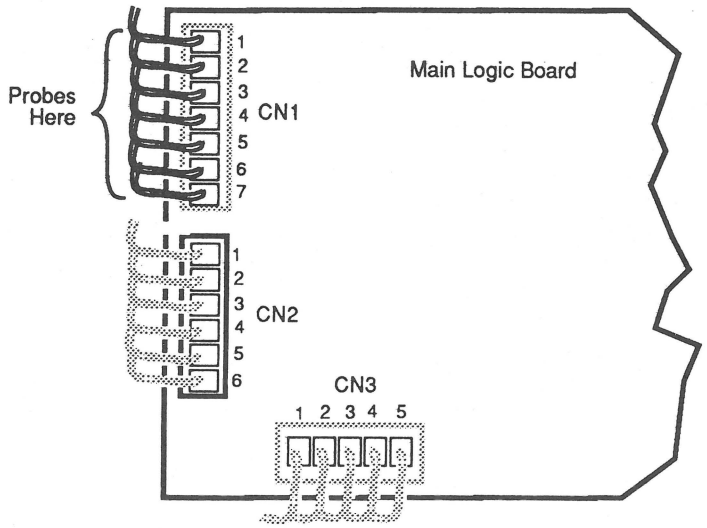
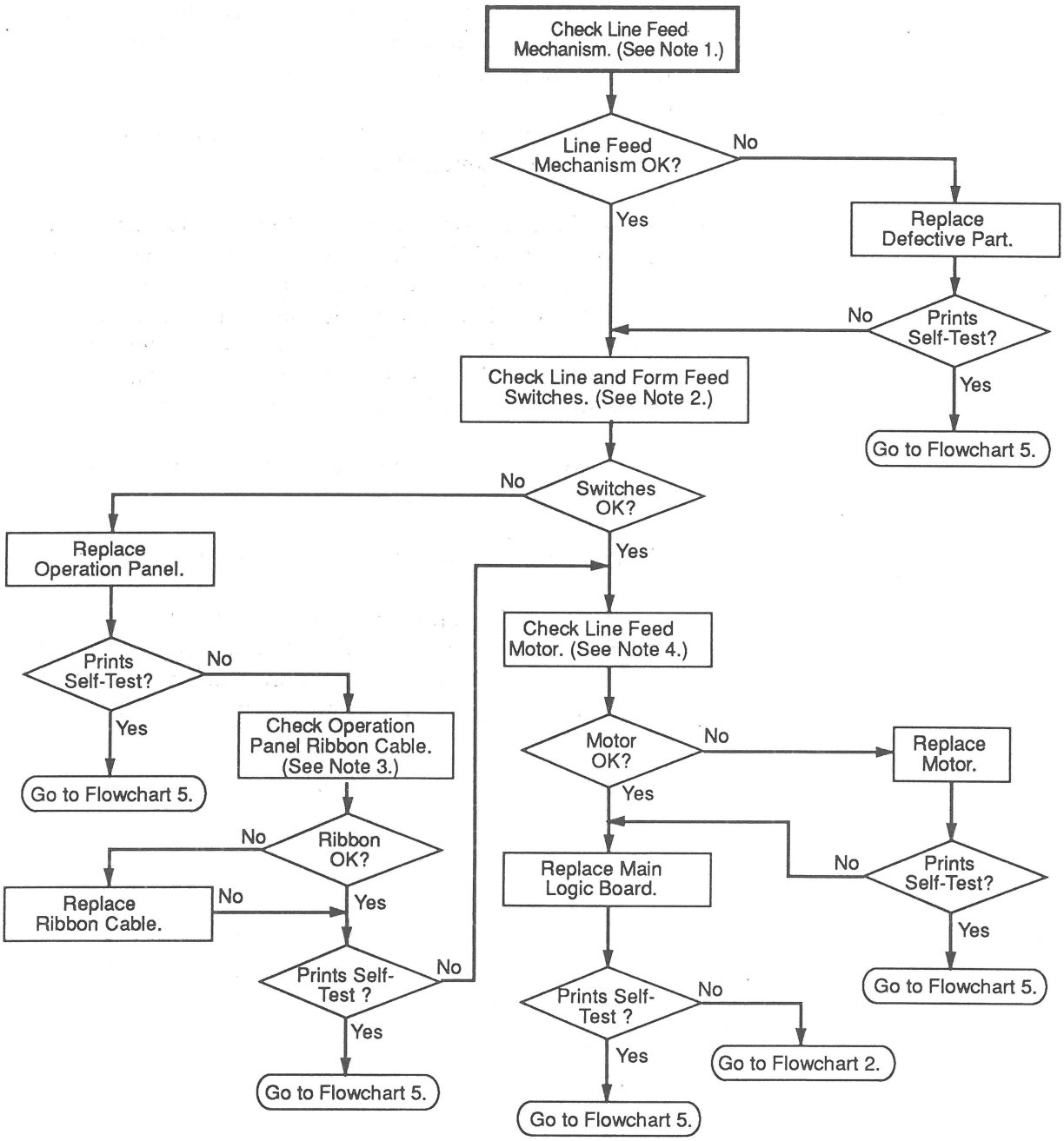


Figure 3-8

Flowchart 3

No Line Feed, Power Light On



Notes for Flowchart 4: Ribbon Color Selection Fails Self-Test

1. Examine the color ribbon cam assembly (printer should be off). Verify that the black tabs on the ribbon plate are riding on the spiral ridge of the ribbon cam.

   Check the ribbon cam adjustment nut for looseness. If the nut is loose, the cam may be misaligned. Also check the copper tab mounted behind and below the ribbon cam. When the cam is all the way up, the vertical ridge on the cam should hit the tab. If the color ribbon assembly is loose, the ribbon cam position is misaligned.

2. Do the color ribbon adjustment procedure (see Section 4, Adjustments).

3. By checking the ribbon motor, you are also checking the continuity of the ribbon cable for the designated pins. If a reading shows **open**, the problem can be the motor windings or the ribbon cable. Before replacing the motor, check the cable as shown in note 4 below. However, if you get a reading that is not within specifications, change the motor.

   a) Disconnect the ribbon cable from the main logic board connector CN5.

   b) Set your multimeter for approximately 200 ohms.

   c) As shown in **Figure 3-9**, put one probe on pin 10 (common) and measure the resistance on pins 2, 4, 6, and 8. The reading should be 120Ω ± 10% on each pin. If the reading is different, then check both the motor and the cable.

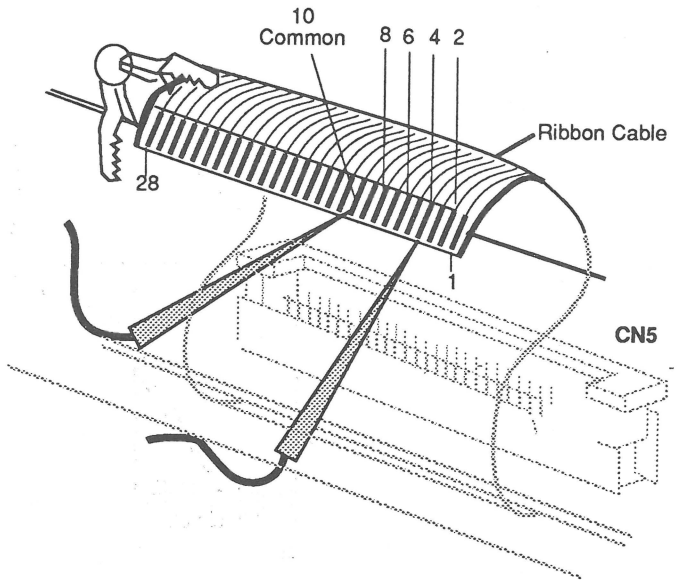


Figure 3-9

4. To check the flexible ribbon cable that runs between the print head PCB and the main logic board, do the following:

   a) Detach the flexible cable from the print head PCB connector CNH1 and from the main logic board at CN5.

   b) Set the digital multimeter to measure continuity.

Notes for Flowchart 4 (continued)

c) Check cable wires 2, 4, 6, 8, and 10 on the ribbon cable for continuity from end to end **(Figure 3-10)**.

d) If any of the lines indicates **open**, replace the cable. (See Section 2, Take-Apart.)

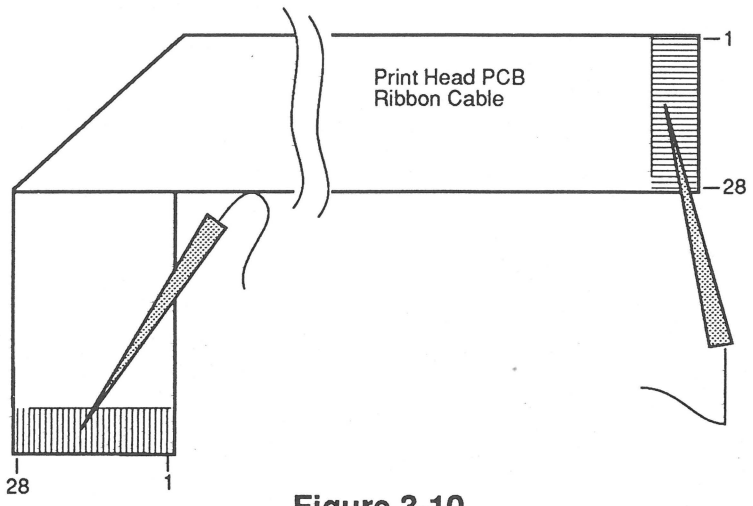
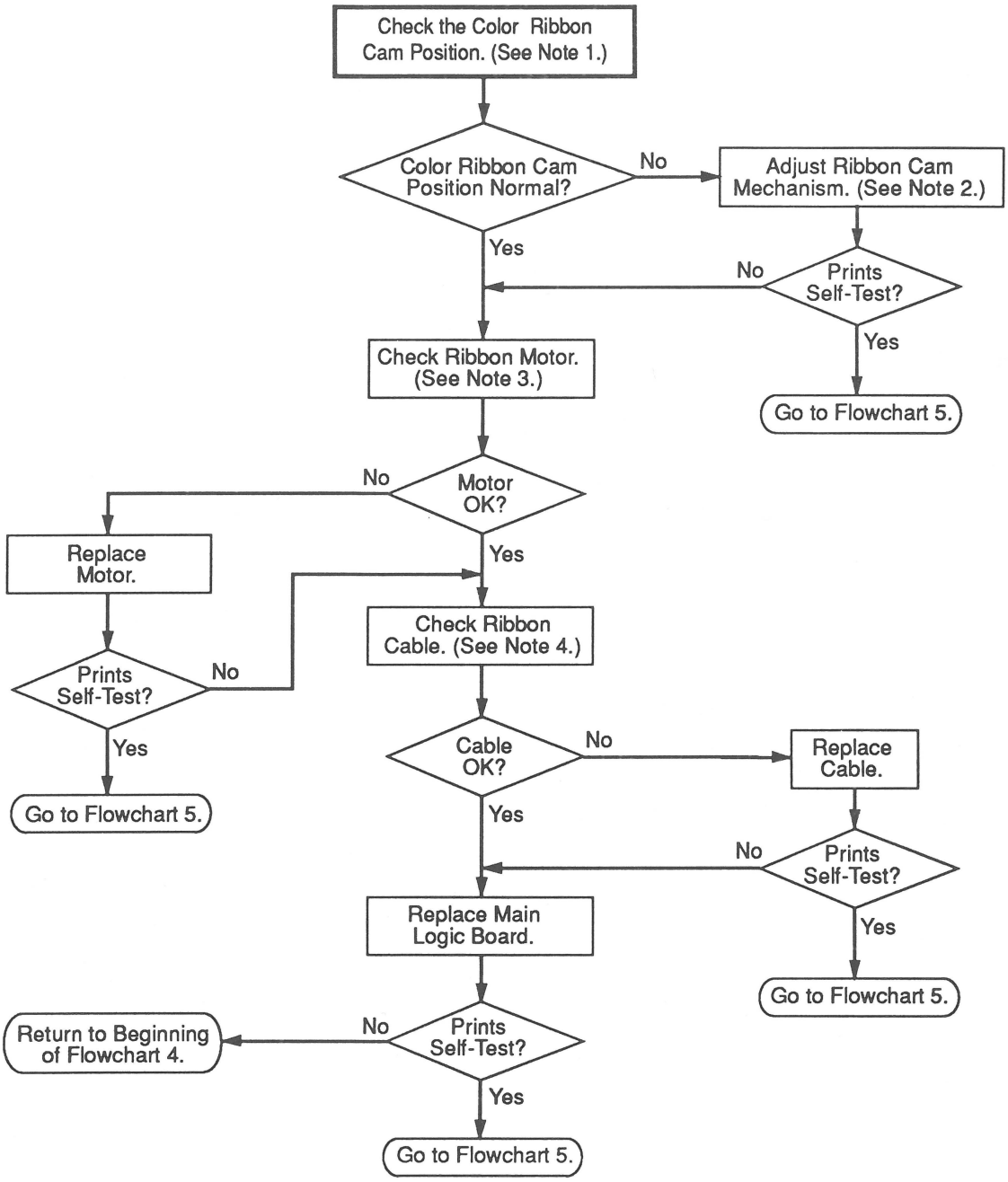


Figure 3-10

Flowchart 4
Ribbon Color Selection Fails Self-Test



Notes for Flowchart 5: Print Quality Problems

1. To check the shims, refer to Section 2, Take-Apart.

2. To perform the ribbon adjustment, refer to Section 4, Adjustments.

3. To align the paper guide, refer to Section 4, Adjustments.

4. When you check the ribbon cable and print head connector (printer should be off), you are checking the continuity of the cable through the print head PCB and the print head connector. If you encounter an open condition between any designated pins, either the cable is bad or the print head PCB (which has the connector mounted to it) is defective. Before replacing either one, measure the continuity between the pins on the cable from end to end. Replace either the print head PCB or the ribbon cable.

   a) Remove the print head.

   b) Set the digital multimeter to measure continuity.

   c) Check for continuity between the pins on the head ribbon cable and the coresponding pins on the print head PCB connector. The pins to be checked are shown below in **Figure 3-11**.

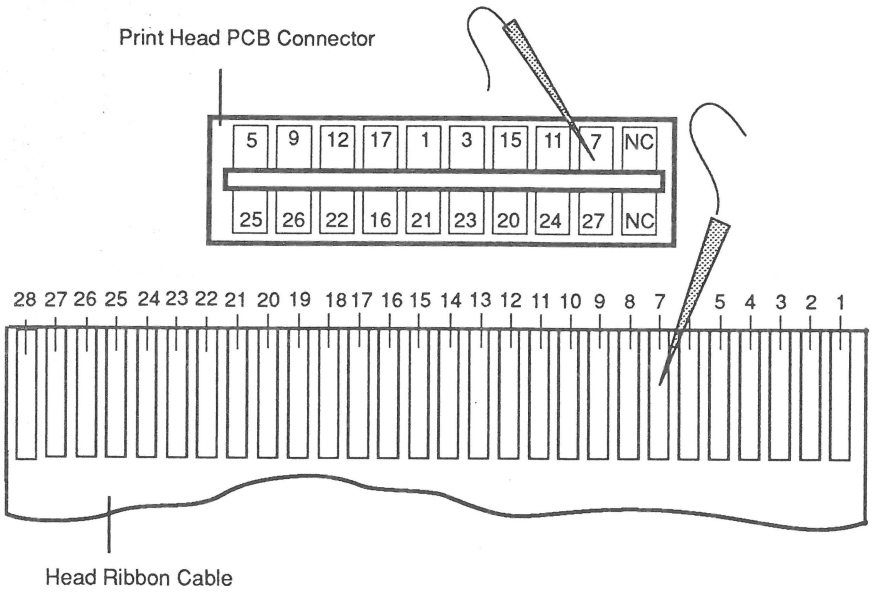


Figure 3-11

Notes for Flowchart 5 (continued)

5. To check the print head, measure the resistance of the solenoids as follows:

   a) Set the digital multimeter to measure approximately 0–5 ohms.

   b) Remove the print head.

   c) Place one probe of the multimeter on each side of the metal finger of the print head as shown in **Figure 3-12**. The resistance should be approximately 3 ohms. If the resistance between any set of pins is not approximately 3 ohms, replace the print head.

   Note: With the print head facing up, the last pair of pins on the left side has an **open** condition. The resistance between the pins should be infinity.

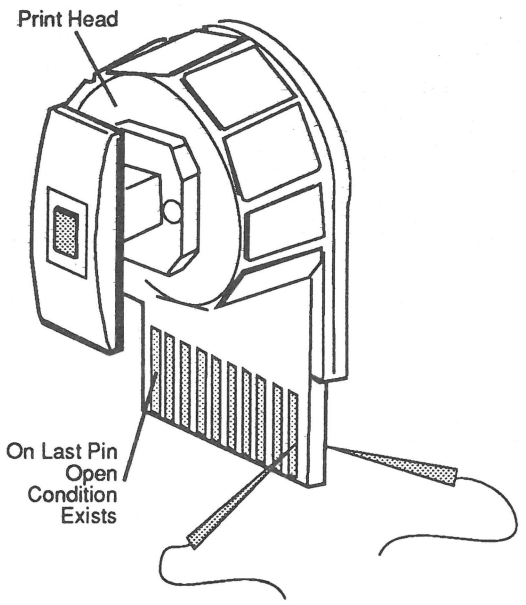
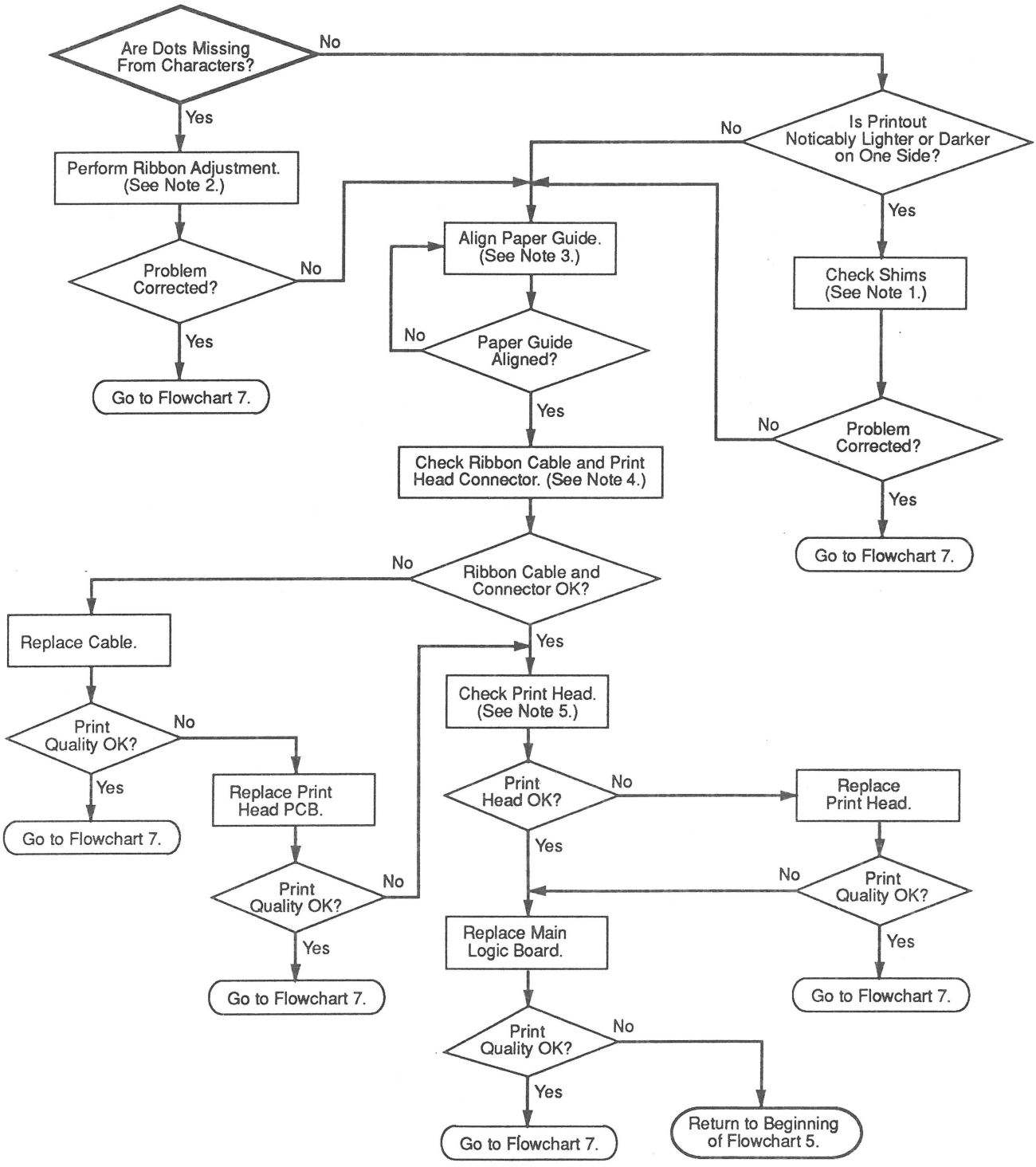


Figure 3-12

Flowchart 5
Print Quality Problems
Poor Quality, No Print, or Dots Missing

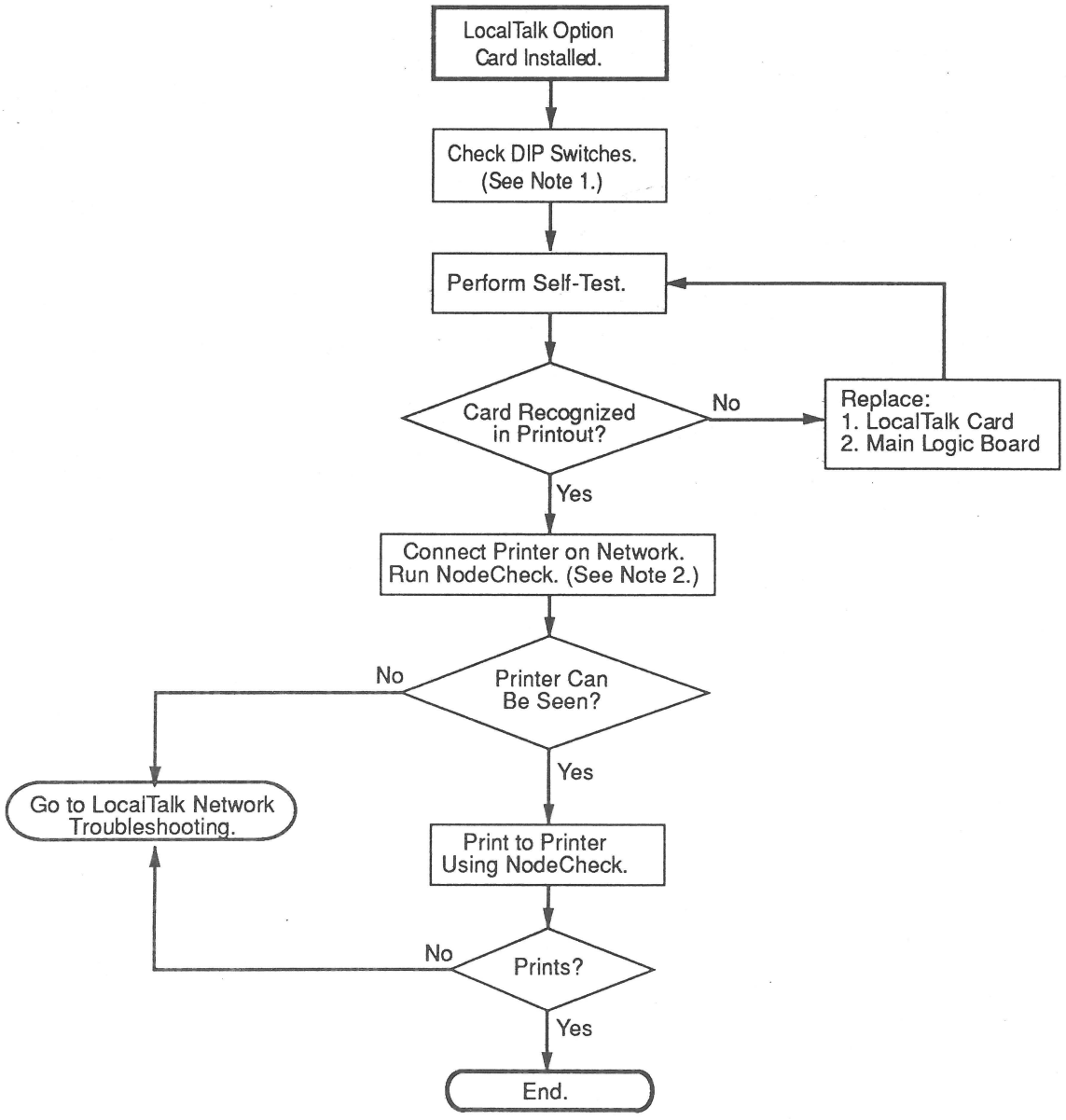


Notes for Flowchart 6: Option Card Malfunctioning

1. ImageWriter II/L DIP switch SW2-4 on the main logic board, **must** be in the closed/down position when a LocalTalk card is installed.

2. If you do not know how to use NodeCheck, see the *LocalTalk Cabling System Technical Procedures.*

Flowchart 6
Option Card Malfunctioning



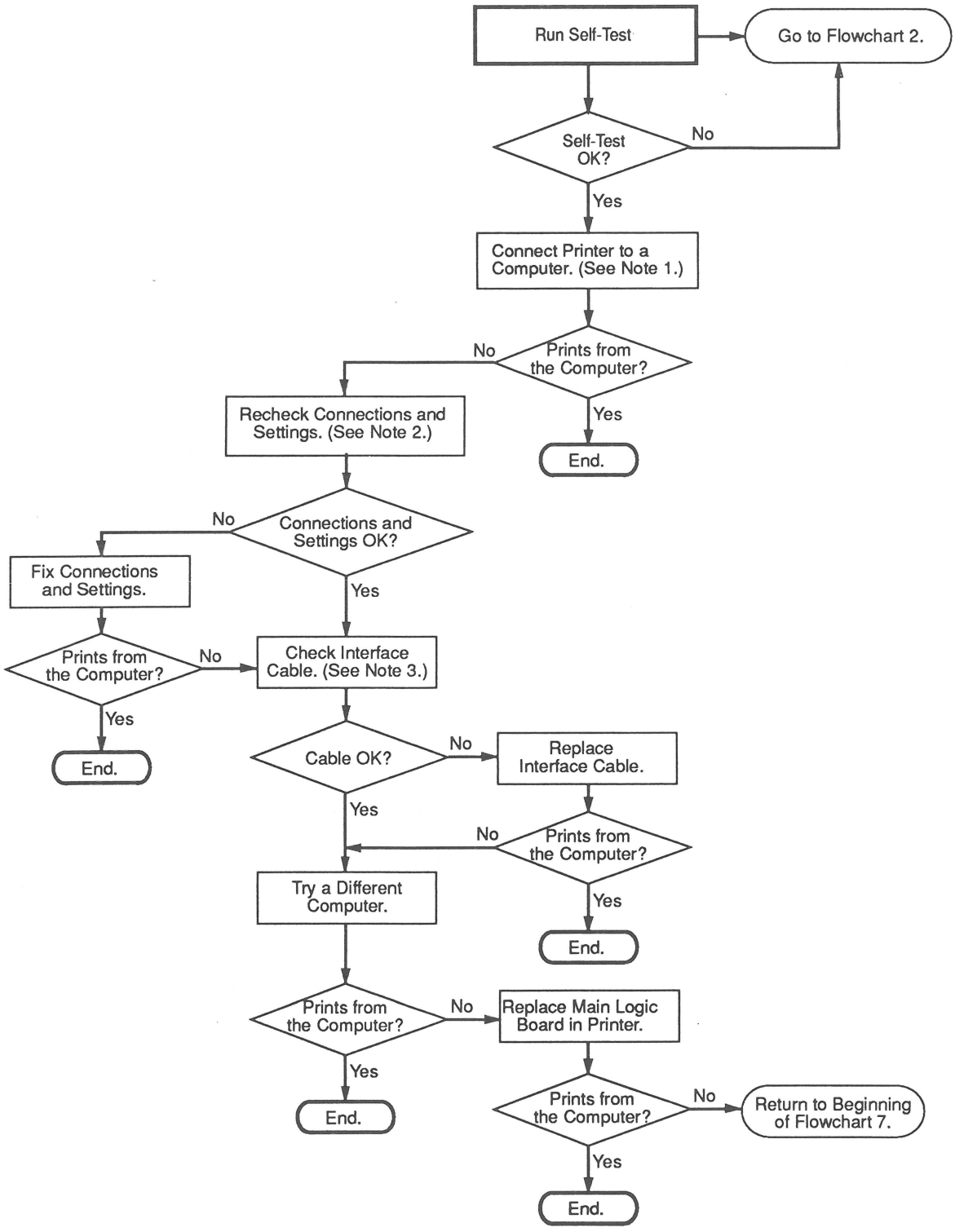
Notes for Flowchart 7: Final Test

1. For correct setup instructions, refer to the printer owner's manual or the owner's manual for the computer you are using.

2. Refer to the *Technical Procedures Peripheral Interface Guide* for directions on setting the printer switches correctly.

3. Check the *ImageWriter II/L Owner's Manual* for more information on the correct cable to use.

Flowchart 7
Final Test



Apple Technical Procedures

ImageWriter II/L

Section 4 – Adjustments

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4.3 Ribbon Assembly
4.4 Firing Hammer
4.5 Impression Lever
4.6 Carrier Belt
4.7 Paper Guide
4.8 Apple II Peripherals Disk

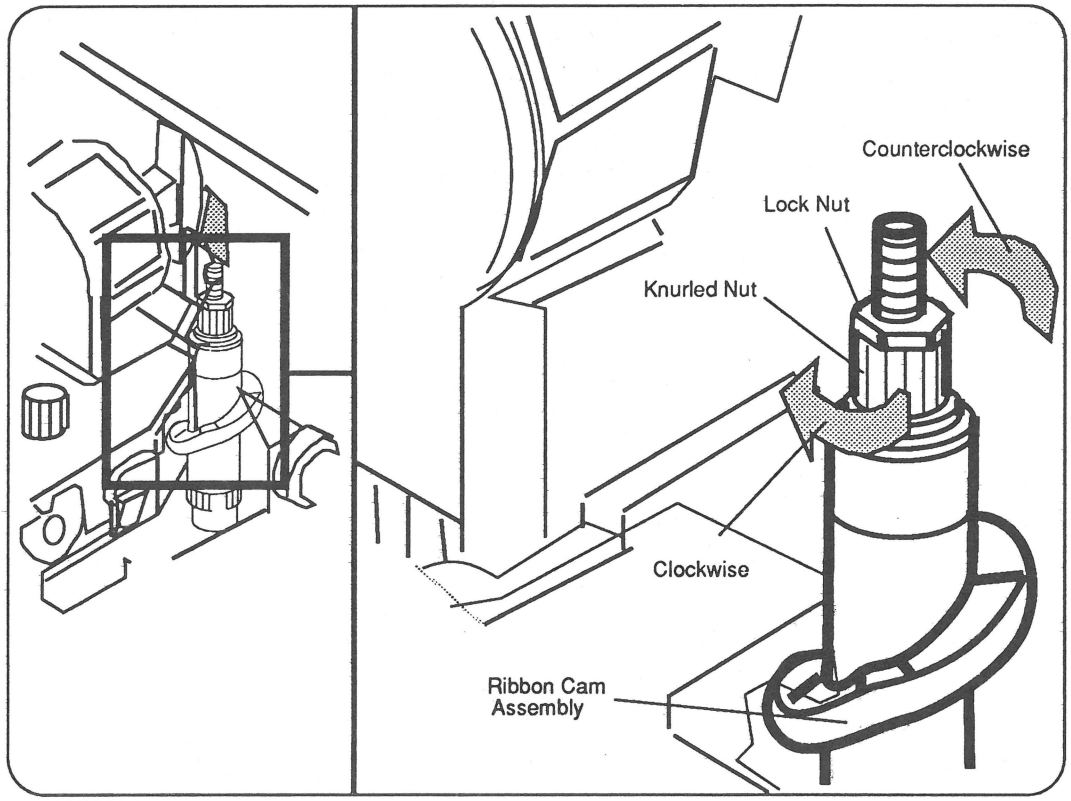

Figure 4-1 Ribbon Cam

❑ RIBBON ASSEMBLY

The ribbon assembly adjustment should be performed when:

- The color print function fails
- The color ribbon assembly has been replaced
- Dots are missing or no printout is seen when using a black ribbon

To do the ribbon adjustment procedure, perform the following:

1. Run the self-test and examine the printout. You should see no overlapping.

   If you are using a color ribbon, the self-test should produce one line of each color (black, yellow, red, blue, orange, green, and purple) and then repeat the same sequence of colors until stopped. If the test doesn't perform as described, or if the colors overlap, continue with step 2.

2. Switch off the printer and remove the paper cover.

3. Locate the ribbon cam assembly **(Figure 4-1)**.

4. Loosen the lock nut, and turn the knurled nut one-half turn. To determine which way to turn the adjustment nut, examine the self-test printout. The first line should be black.

   If the bottom half of the letters are missing in the first (black) line, turn the adjustment nut clockwise.

   If the first line is printed with the top half of the letters missing (or half blue), turn the adjustment nut counterclockwise.

5. Tighten the lock nut. Run the self-test and examine the printout. Repeat steps 2 to 4 if the self-test is overlapping. You may need to repeat the self-test several times. When the colors print correctly with no overlapping, the adjustment is complete.

❑ FIRING HAMMER

The firing hammer adjustment should be done only when the carrier belt, carrier shaft, carrier motor, or main logic board is replaced.

To adjust the firing hammer:

1. Connect the printer to a computer.

2. Power on the printer and the computer.

3. Print a few lines of the capital letter "H." Check the printed letters for any misalignment. See **Figure 4-2** for an example.

Figure 4-2 Firing Hammer

4. **If the letters are misaligned**, remove the carrier cover and change the settings of DIP switches 2-5 and 2-6. Change only one switch at a time.

5. Perform step 3 again. Repeat the procedure until the lines of the capital letter "H" are aligned.

❑ IMPRESSION LEVER

The impression lever is located under the carrier top cover, to the extreme right (see Section 3, Take-Apart, for more information). This lever **(Figure 4-3)** moves the dot head away from or closer to the platen. Adjust the position of the lever if the print quality is too light or too dark.

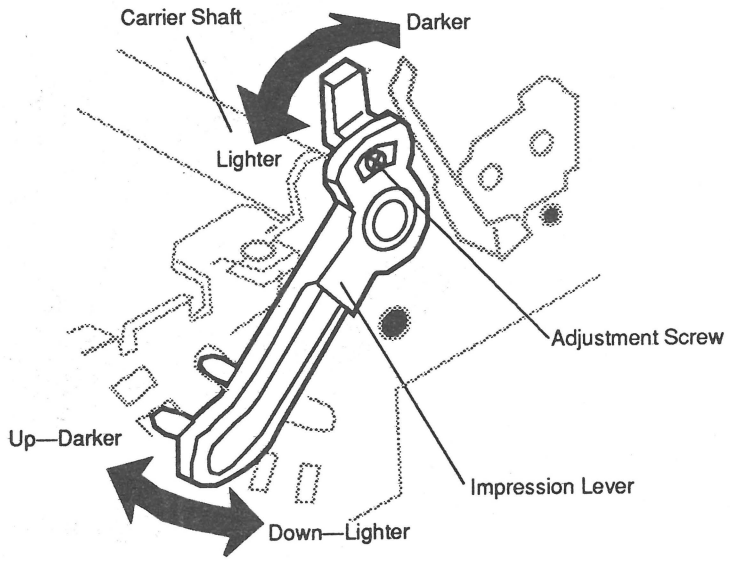

Figure 4-3 Impression Lever

If the print is still too light or too dark after you have moved the impression lever, adjust the lever using the adjustment screw.

Moving the screw to the topmost position brings the carriage assembly closer to the platen. Adjusting the screw to the lowest position brings the carriage assembly away from the platen. This adjustment gives a little more range to the impression lever.

❑ CARRIER BELT

The adjustment screw, which increases or decreases the amount of tension on the carrier belt, is located under the carrier cover, to the right **(Figure 4-4)**.

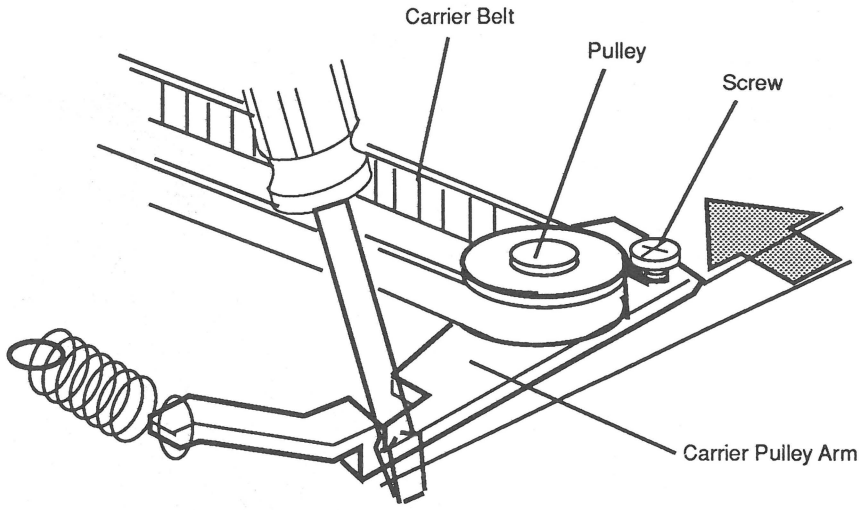

Figure 4-4 Carrier Belt

To adjust the carrier belt:

1. Loosen the adjustment screw.
2. To loosen the tension on the carrier belt, push the metal plate (below the screw) to the left.
3. Tighten the adjustment screw.

❑ PAPER GUIDE

To adjust the paper guide, loosen the two screws **(Figure 4-5)** and slide the paper guide either forward or back until the gap is the correct width; then tighten the screws.

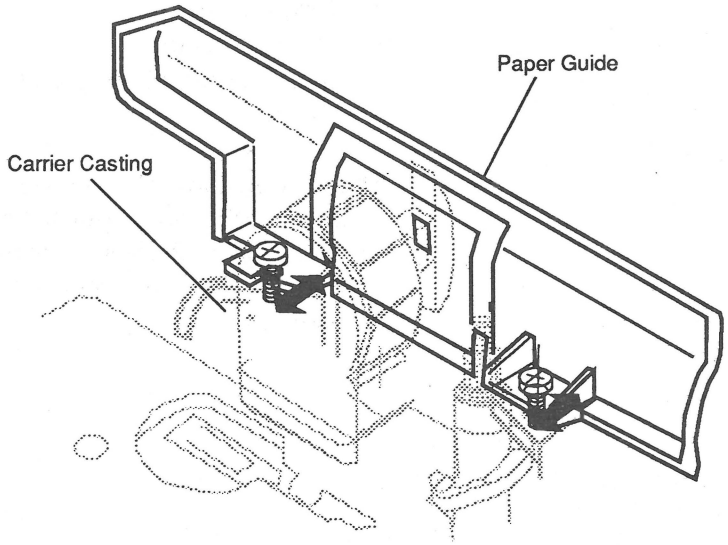

Figure 4-5 Paper Guide

To verify that the paper guide is adjusted correctly, the impression lever should be all the way forward. When the paper guide is correctly positioned, it will move approximately .0005 inch when you press it toward the platen. Verify this movement by rolling two sheets of paper under the platen. The paper guide should be snug with little or no movement toward the platen.

❑ APPLE II PERIPHERALS DISK

The *Apple II Peripherals Disk* performs the following tests:

- Character Set
- Alternate Sets
- Custom Character
- Graphic Images
- Margins/Tabs
- Registration (Firing Hammer)
- Color

The Registration (Firing Hammer) and Color tests are used for adjustment purposes. If you do not have the disk, use the "Ribbon Assembly" and "Firing Hammer" procedures in this section to make the necessary adjustments.

Apple Technical Procedures

ImageWriter II/L

Section 5 – Additional Procedures

❑ CONTENTS

5.2 Shims
5.2 Materials Required
5.3 Check the Gap
5.4 Install
5.5 Remove

Note: If a step is underlined, detailed instructions for that step can be found in Take-Apart.

❑ SHIMS

A shim is a small, three-sided metal piece with two holes on one side **(Figure 5-1)**. The shim is used to correct the distance between the print head and the platen.

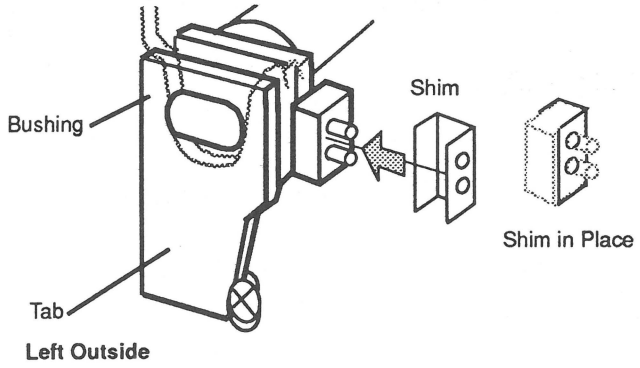

Figure 5-1 Shim

IMPORTANT: *Before performing this procedure, check that the cam washer on the left side of the carrier shaft is in position (Figure 5-2). The flat part of the hole in the cam should be in the top position when placing the cam on the carrier shaft. Refer to Section 2, Take-Apart, "Carrier Assembly," for complete instructions.*

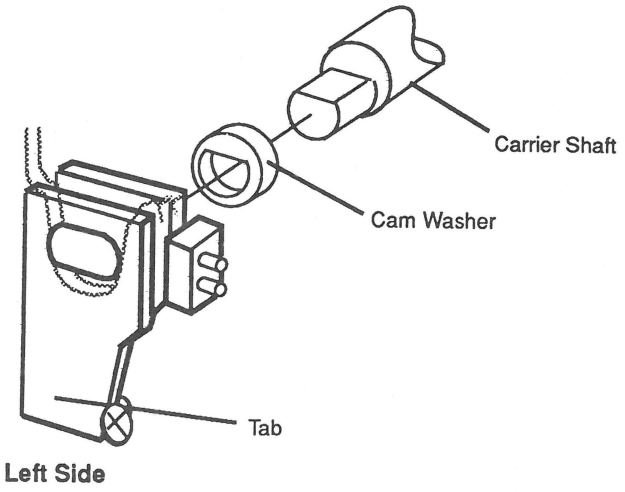

Figure 5-2 Cam Washer

Materials Required

Shims (0.002 inch, 0.004 inch, and 0.008 inch)
Feeler gauge
Phillips screwdriver
Small needlenose pliers

Check the Gap

1. Remove the paper cover and ribbon cartridge.
2. Gently pull the impression lever up, so that the dot head is in the closest position.

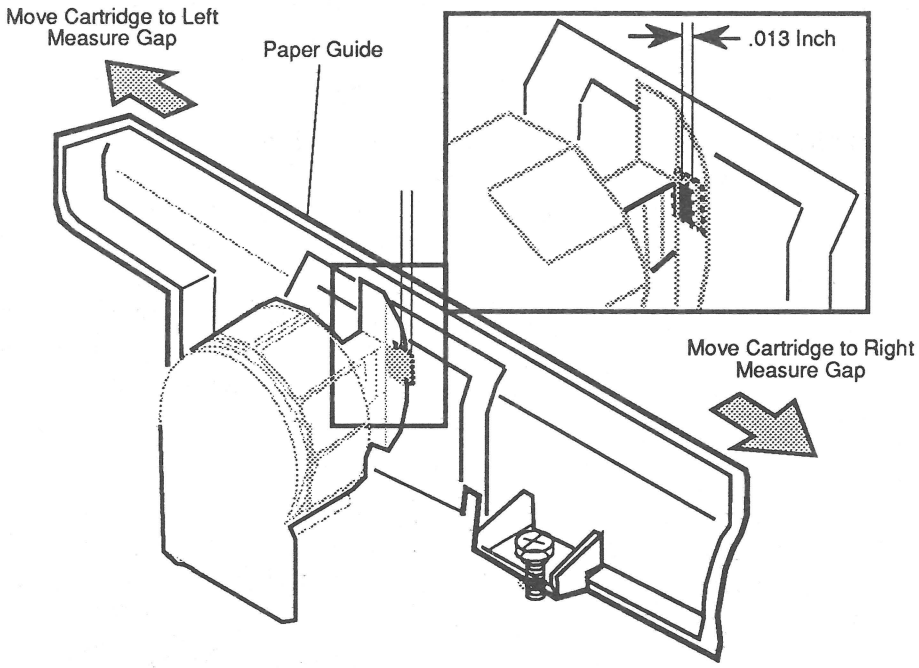

Figure 5-3 Print Head/Paper Guide Gap

3. Push the carrier assembly to the far right. Then, using a feeler gauge, measure the gap between the front of the print head and the metal shield on the paper guide **(Figure 5-3)**. Record the measurement.
4. Push the carrier assembly to the far left. Then, using the feeler gauge, measure the gap between the front of the print head and the metal shield on the paper guide. Record the measurement.

   Note: The recommended size of the gaps measured in steps 3 and 4 is 0.013 inch (0.33 mm) ± 0.002 inch (0.05 mm). If the gaps are within this range, you do not need to do anything with the shims. If the gaps are not within this range, proceed to step 5.

5. Subtract the right-side gap (measured in step 3) from the left-side gap (measured in step 4).

   - If the difference is a positive number, go to "Install."
   - If the difference is a negative number, go to "Remove."

Install

To install a shim,

1. Select a shim whose thickness is closest to the difference calculated.

   a) 0.002 inch (0.05 mm)
   b) 0.004 inch (0.1 mm)
   c) 0.008 inch (0.2 mm)

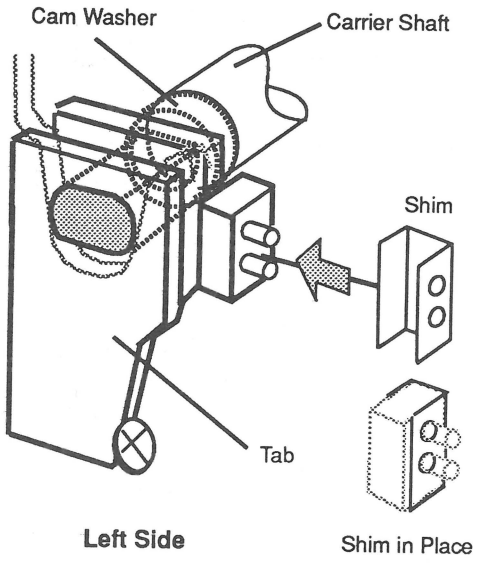

Figure 5-4

2. Push the carrier shaft toward the rear of the machine. Using needlenose pliers, install the shim on the left side of the carrier bar by inserting the two protruding tabs into the holes on the shim **(Figure 5-4)**. Slide the shim into position. Release the carrier shaft.

3. Verify that the gap between the print head and the paper guide is now correct (0.013 inch ± 0.002 inch).

4. Replace the ribbon cartridge and the paper cover.

5. Perform the self-test.

Remove

To remove a shim,

1. Look at the left side of the carrier shaft **(Figure 5-4)**.

   - If a shim is installed, remove it with needlenose pliers.

   - If no shim is installed, be sure the cam washer on the left side is positioned correctly.

2. Verify that the gap between the print head and the paper guide is now correct (0.013 inch ± 0.002 inch).

3. Replace the ribbon cartridge and the paper cover.

4. Perform the self-test.

Apple Technical Procedures

ImageWriter II/L

Illustrated Parts List

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IPL.3 Exploded View—ImageWriter II/L Subassemblies (Figure A)
IPL.5 Key to Codes for Screws, Washers, etc.
IPL.5 Frame (Figure 1)
IPL.7 Paper Guide Assembly (Figure 2)
IPL.9 Platen and Tractor Assemblies, Top View (Figure 3)
IPL.11 Carrier Block (Figure 4)
IPL.13 Carrier Assemblies (Figure 5)
IPL.15 Covers (Figure 6)
IPL.17 ImageWriter II/L PCBs (Figure 7)
IPL.19 Cables (Figure 8)
IPL.21 Shift Gear Assembly (Figure 9)
IPL.21 Paper Bail Assembly (Figure 10)
IPL.21 Pinch Roller Assembly (Figure 11)
IPL.23 Color Ribbon Assembly (Figure 12)
IPL.25 Carrier Parts (Figure 13)
IPL.27 Ribbon Frame Assembly (Figure 14)
IPL.27 Ribbon Wire and Spring (Figure 15)
IPL.29 Operation Panel (Figure 16)
IPL.31 Frame Parts (Figure 17)
IPL.32 Quick Reference—Screws (Figure 18)
IPL.33 Miscellaneous Hardware Kit

The figures and lists in this section include all piece parts that can be purchased separately from Apple for the ImageWriter II/L, along with their part numbers. These are the only parts available from Apple. Refer to your *Apple Service Programs* manual for prices.

Figure A shows the orientation of different subassemblies in the ImageWriter II/L. At the end of this section is a Quick Reference showing all screws for the ImageWriter II/L. All figures supplement the Take-Apart section of these procedures by showing how parts fit togther.

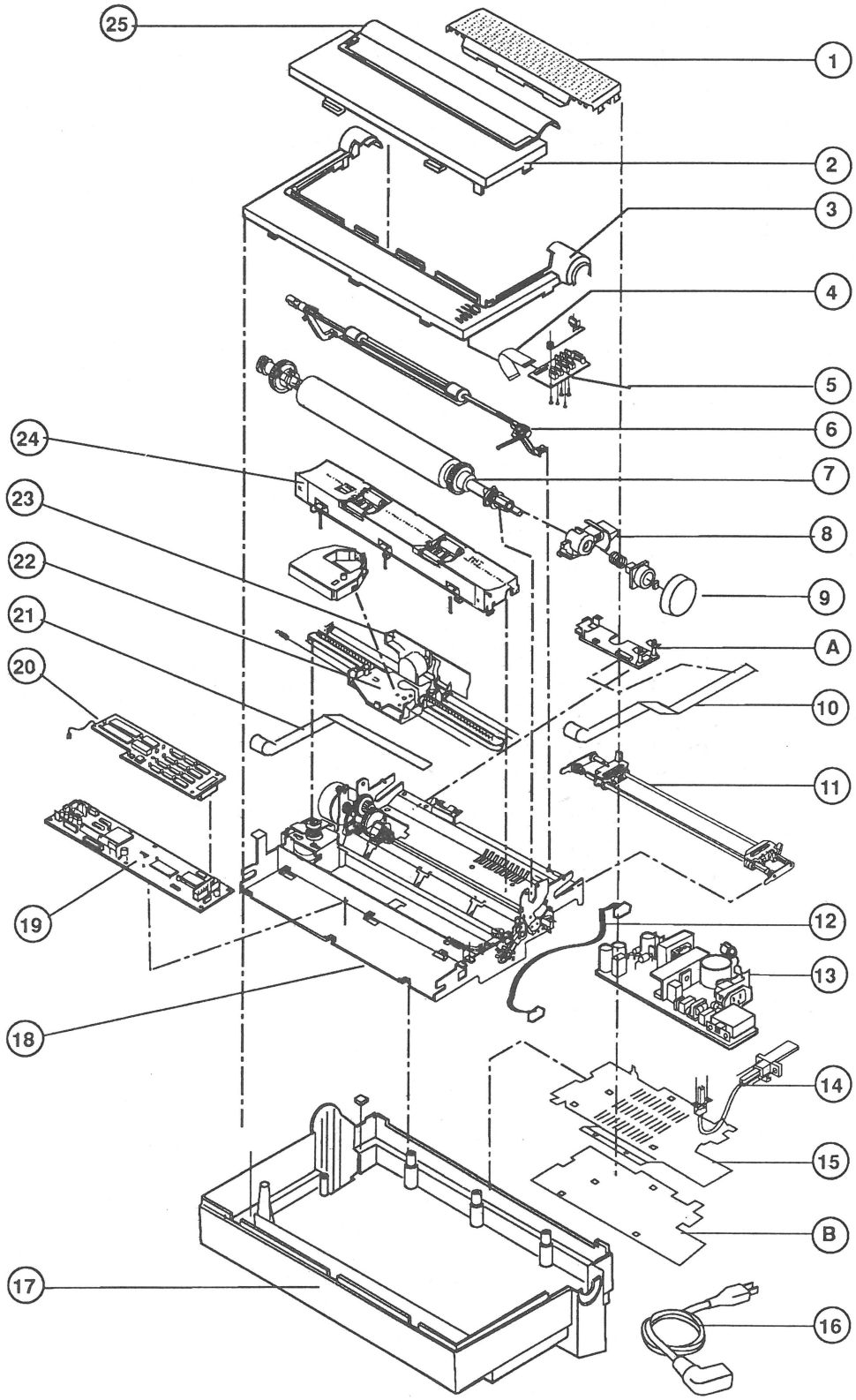

Figure A

❑ EXPLODED VIEW—IMAGEWRITER II/L SUBASSEMBLIES (Figure A)

Item	Description	See Figure #
1	Tractor Cover	6
2	Ribbon Cover, Platinum	6
3	Top Cover, Platinum	6
4	Cable, Operation Panel PCB	8, 16
5	Operation Panel, Platinum	7, 16
6	Paper Bail Assembly	2, 10
7	Platen Assembly	3
8	Paper Selector Lever	6
9	Platen Assembly Knob, Platinum	6
10	Cable, Interface Card	8
11	Tractor Assembly	3
12	Cable, Power Supply to Main Logic Board	8
13	Power Supply Board PCB	7
14	Power-On Switch Actuator and Cable Assembly	7
15	Ground Plate, Power Supply, 110/120V Ground Plate Assembly, Power Supply, 220/240V	6, 7
16	Cable, Power, 110/120V	8
17	Cover, Bottom Assembly, Platinum	6
18	Frame	1, 17
19	Main Logic Board PCB	7
20	LocalTalk Option Card	7
21	Cable, Carriage Assembly PCB	4, 8
22	Carrier Block Assembly	4, 5, 13, 14
23	Paper Guide	2, 4
24	Pinch Roller Assembly	2, 11
25	Paper Cover, Smoke	6

Note: The parts listed below are shown in Figure A, but are not available separately.

A Sub-PCB
B Mylar, Ground Plate, Power Supply, 220/240V

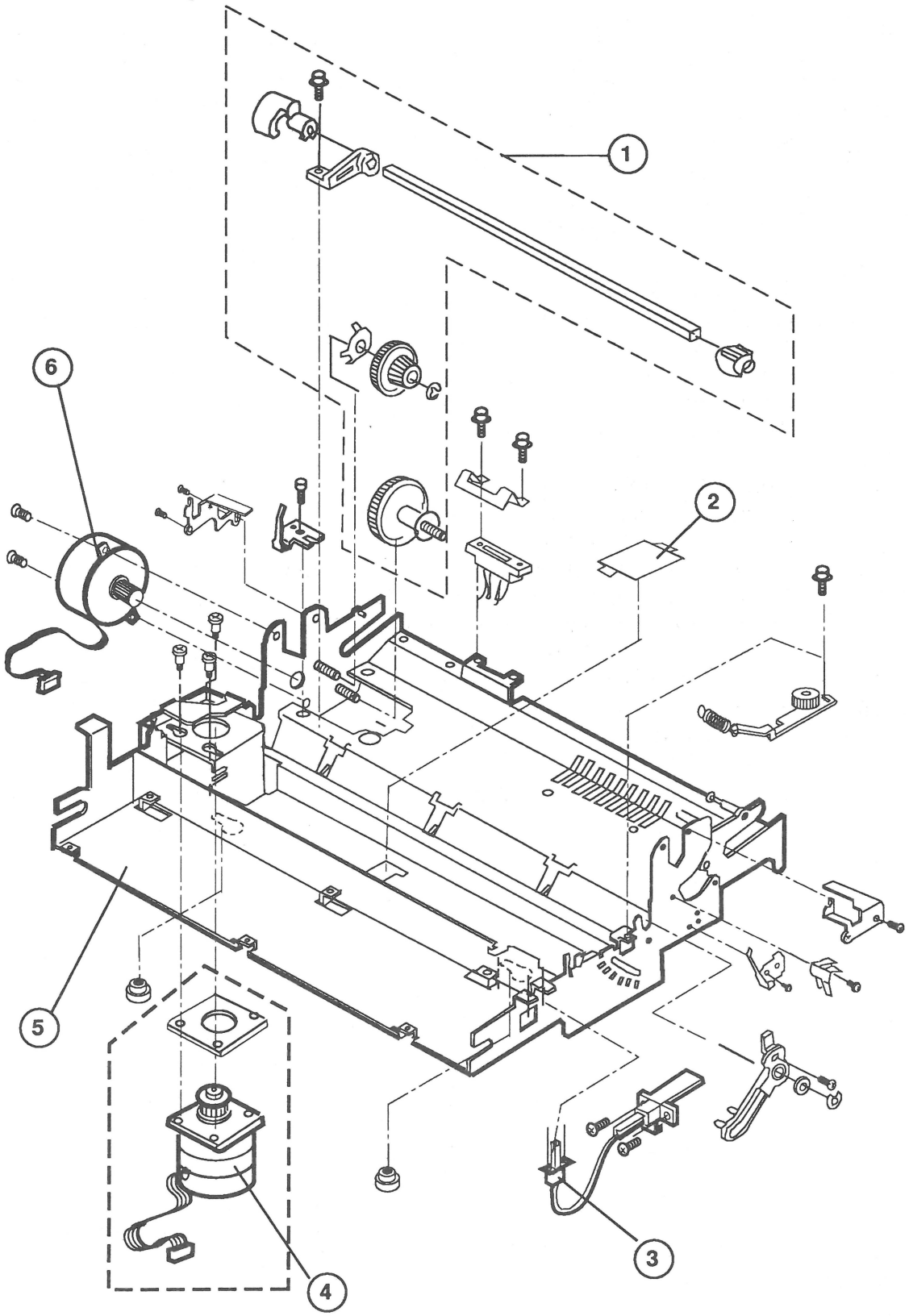

Figure 1

❑ KEY TO CODES FOR SCREWS, WASHERS, ETC.

All screws are standardized in ISO. All measurements are in millimeters. Diameter is given first, then length. "SM-3 x 8" means "Sems screw, 3 mm diameter by 8 mm length." **Screws and washers are not included with assemblies.**

C	=	C-ring	SM	=	sems screw
D	=	dish head screw	SMW	=	double sems screw
E	=	E-clip	SP	=	spring pin
F	=	flat head screw	SW	=	spring washer
FL	=	flanged screw	T	=	tapping screw
H	=	hexagon bolt	TW	=	toothed washer
N	=	hexagon nut	U	=	U-ring
P	=	pan head screw	W	=	washer
S	=	set screw			

❑ FRAME (Figure 1)

Item	Part No.	Description
1	076-0150	Shift Gear Assembly
2	949-0254	Guide, Flex Cable
3	983-0018	Power-On Switch Actuator and Cable Assembly
4	652-0602	Carrier Motor Kit
5	948-0136	Frame
6	959-0046	Paper Feed Motor

Note: Some of the other parts shown in this diagram are available as "Frame Parts." Refer to Figure 21 for further information.

The following screws, E-clips, etc., are used in the parts shown in Figure 1:

E-3	SMW-2.6 x 6
E-4	SMW-3 x 6
SM-2.6 x 6	SMW-3 x 8
SM-3 x 6	SMW-4 x 6
SM-3 x 8	W-3.3

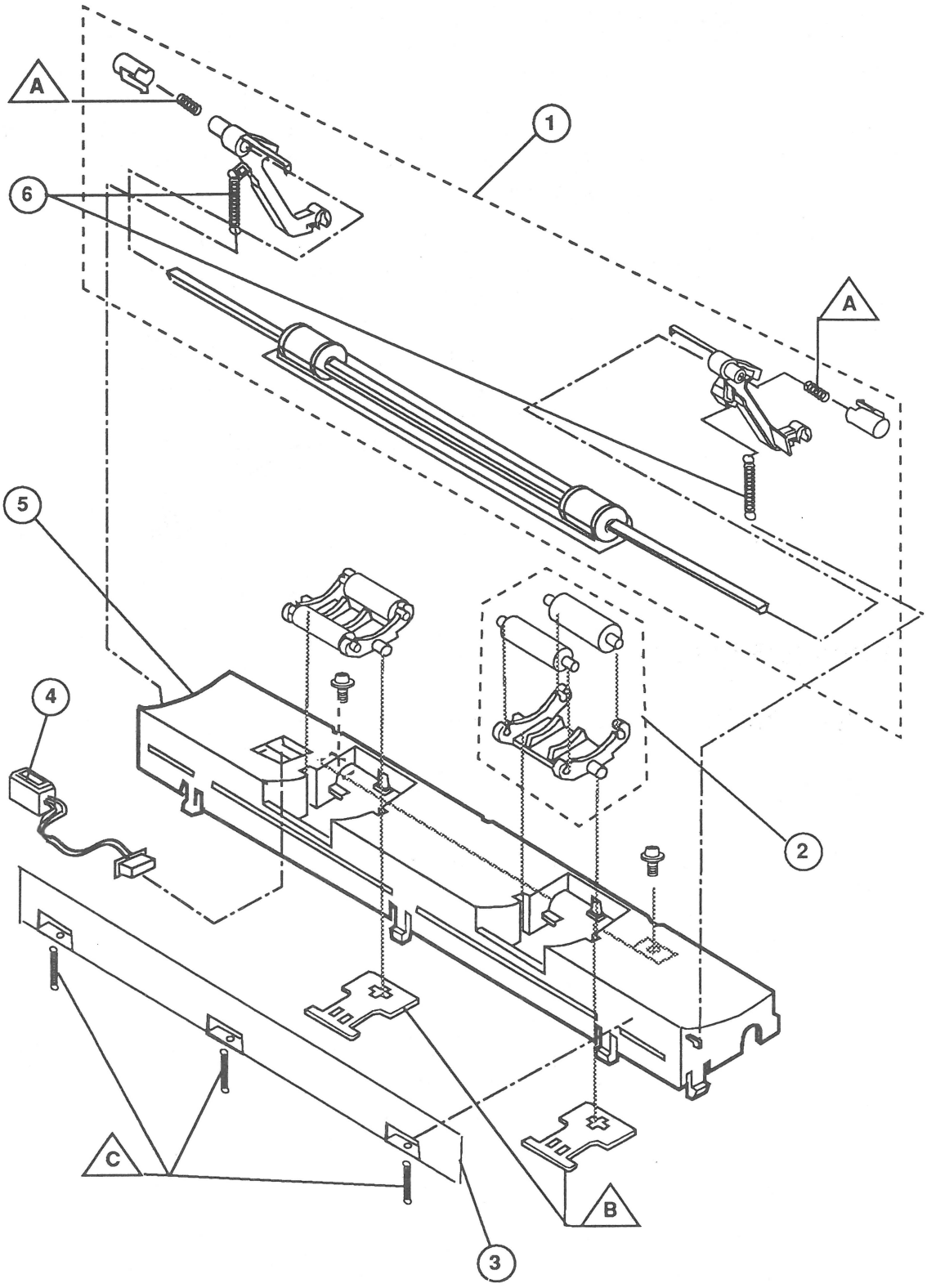

Figure 2

❑ PAPER GUIDE ASSEMBLY (Figure 2)

Item	Part No.	Description
1	076-0154	Paper Bail Assembly
2	076-0155	Pinch Roller Assembly
3	076-0305	Paper Deflector and Springs
4	925-0011	Optical Paper-Out Sensor
5	949-0131	Paper Guide for Optical Sensor
6	957-0041	Spring, Bail Roller Arm (3/pk)

Note: Parts shown as items A, B, and C in this diagram are available as part of the Miscellaneous Hardware Kit. Refer to Miscellaneous Hardware Kit for further information. These parts are not available separately.

A	Spring, Bail Roller Shaft (5/pk)
B	Plate, Pinch Roller Spring (3/pk)
C	Spring, Deflector (3/pk)

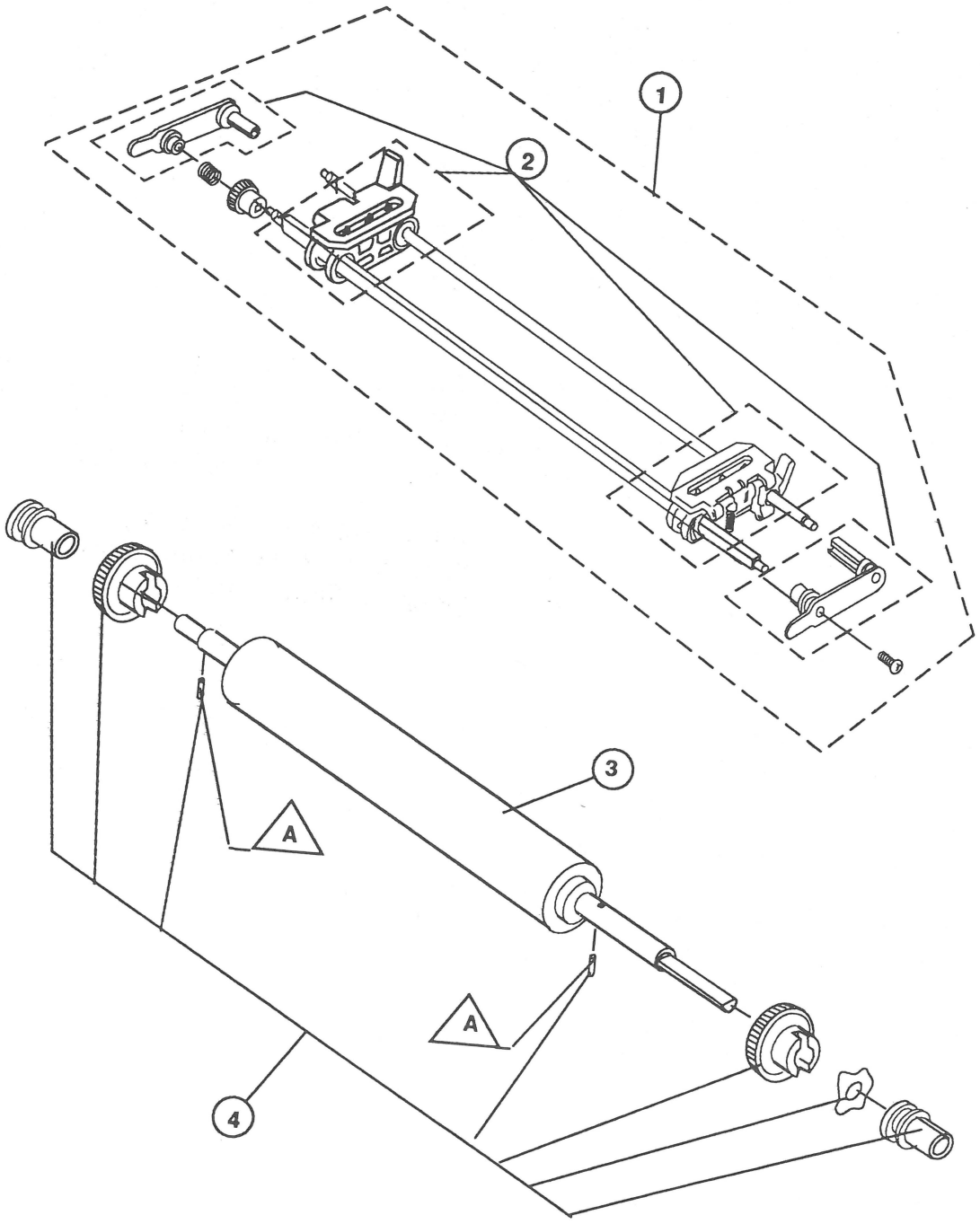

Figure 3

❑ PLATEN AND TRACTOR ASSEMBLIES, TOP VIEW (Figure 3)

Item	Part No.	Description
1	076-0152	Tractor Assembly (includes all parts shown)
2	076-0151	Tractor with Bushing (includes only items marked "2")
3	949-0006	Platen
4	076-0153	Platen Assembly Parts without Platen

Note: The part shown as item A in this diagram is available as part of the Miscellaneous Hardware Kit. Refer to Miscellaneous Hardware Kit for further information. This part is not available separately.

A Spring Pin, D-2 x 16 (3/pk)

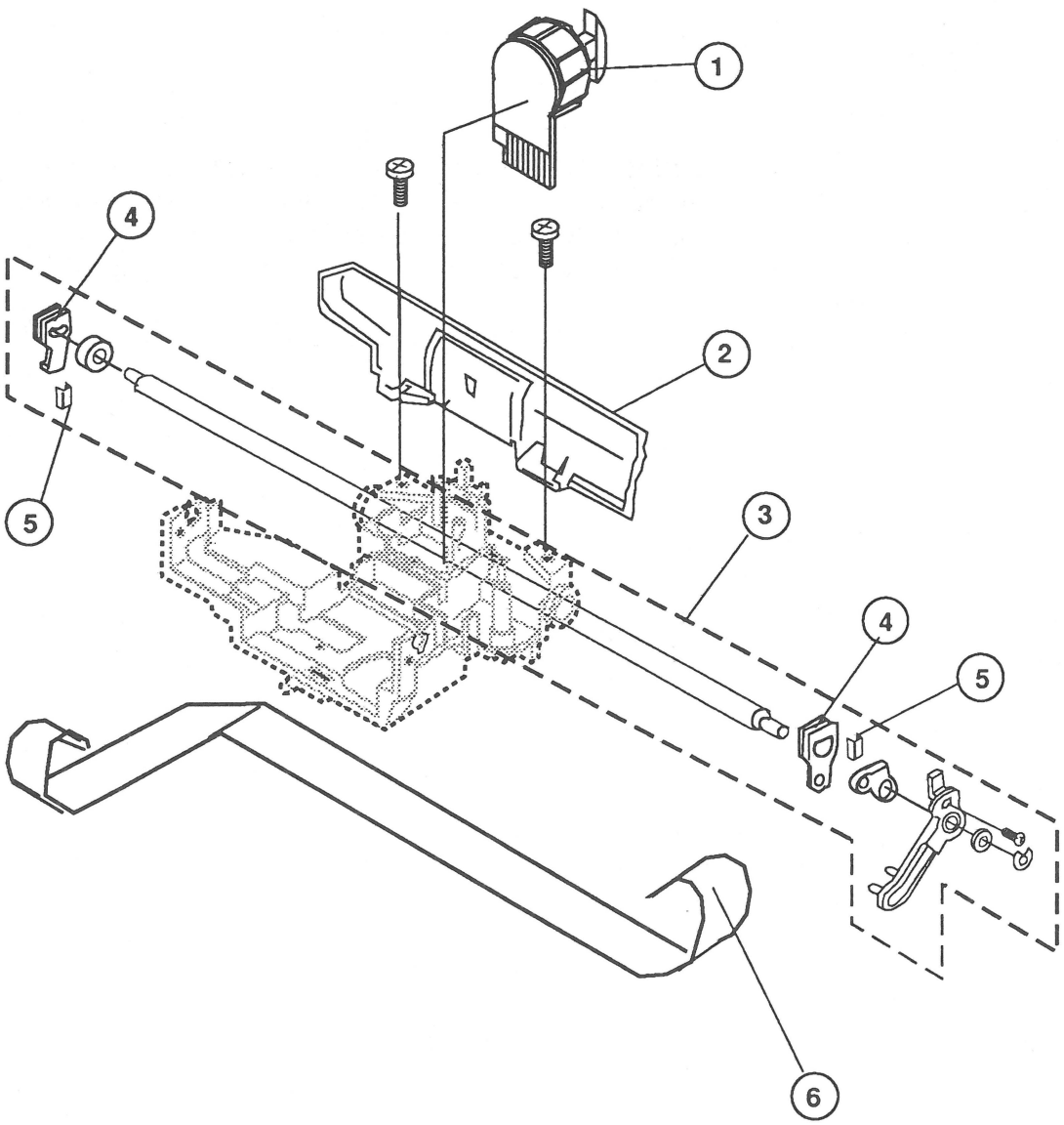

Figure 4

❑ CARRIER BLOCK (Figure 4)

Item	Part No.	Description
1	661-0316	Print Head
2	949-0029	Paper Guide
3	076-0157	Carrier Block Assembly
4	958-0006	Carrier Shaft Bushing (10/pk)
5	955-0005	Shims (3 sets of 5)
6	590-4551	Cable, Carriage Assembly PCB

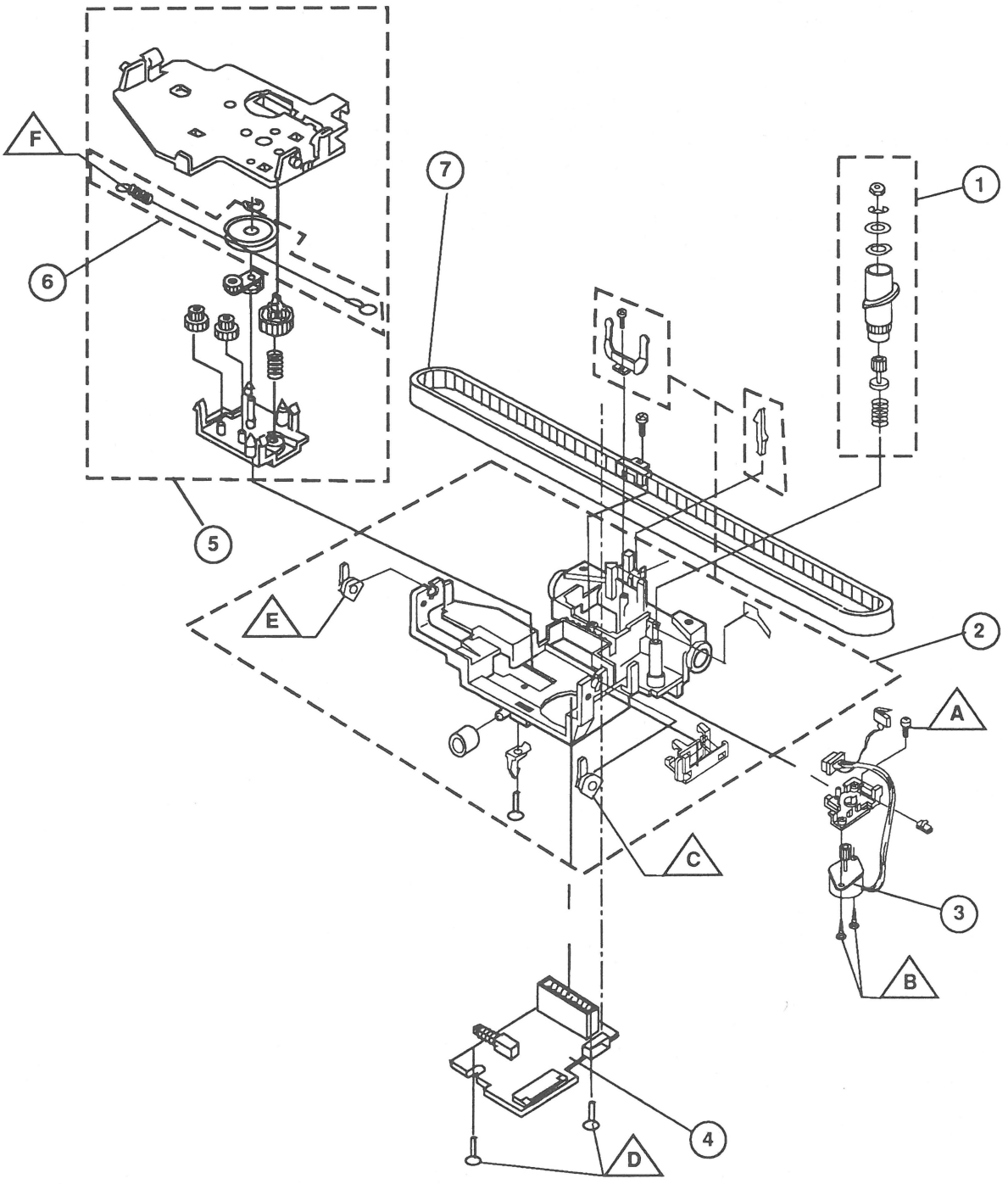

Figure 5

❑ CARRIER ASSEMBLIES (Figure 5)

Item	Part No.	Description
1	076-0366	Color Ribbon Assembly
2	076-0160	Carrier Parts
3	959-0047	Motor Assembly, Ribbon
4	982-0059	Print Head PCB
5	076-0159	Ribbon Frame Assembly
6	935-0001	Ribbon Wire and Spring
7	959-0002	Carrier Belt

The following screws, E-clips, etc., are used in the parts shown in Figure 5:

E-3	P-2.6 x 8
E-4	SM-3 x 10
P-2.6 x 6	SM-2.6 x 5
T-2.6 x 5	W-5.5

Note: The parts labeled A through F in this diagram are available as part of the Miscellaneous Hardware Kit. Refer to Miscellaneous Hardware Kit for further information. These parts are not available separately.

A	Screw, Pan Head, 2.6 x 8 (3/pk)
B	Screw, Tapping, 2.6 x 5 (3/pk)
C	Bushing, Ribbon Frame, Right (3/pk)
D	Screw, Head PCB (3/pk)
E	Bushing, Ribbon Frame, Left (3/pk)
F	Spring, Ribbon Wire (3/pk)

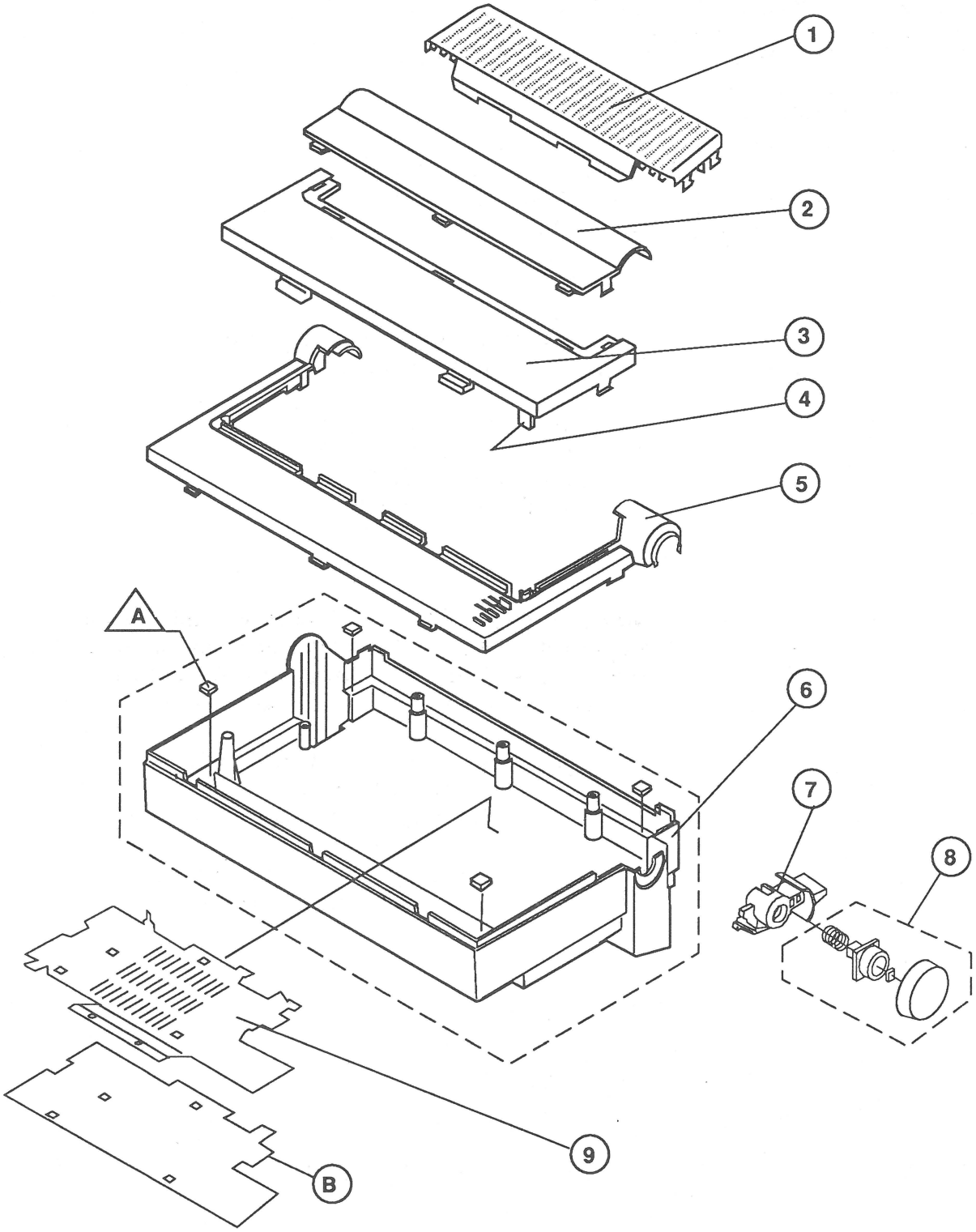

Figure 6

❑ COVERS (Figure 6)

Item	Part No.	Description
1	949-0085	Tractor Cover, Platinum
2	949-0008	Paper Cover
3	949-0320	Ribbon Cover, Platinum
4	952-0012	Top Case Magnet (10/pk)
5	949-0249	Top Cover, Platinum
6	949-0248	Bottom Assembly Cover, Platinum
7	949-0262	Paper Selector Lever
8	076-0368	Platen Assembly Knob, Platinum
9	949-0251	Ground Plate, Power Supply, 110/120V
	949-0263	Ground Plate Assembly, Power Supply, 220/240V

Note: The part shown as item A in this diagram is available as part of the Miscellaneous Hardware Kit. Refer to Miscellaneous Hardware Kit for further information. This part is not available separately.

A Rubber Cushion

Note: The part shown as item B in this diagram is not available separately. It is part of the ground plate assembly for the 220/240V power supply.

B Mylar, Ground Plate, Power Supply, 220/240V

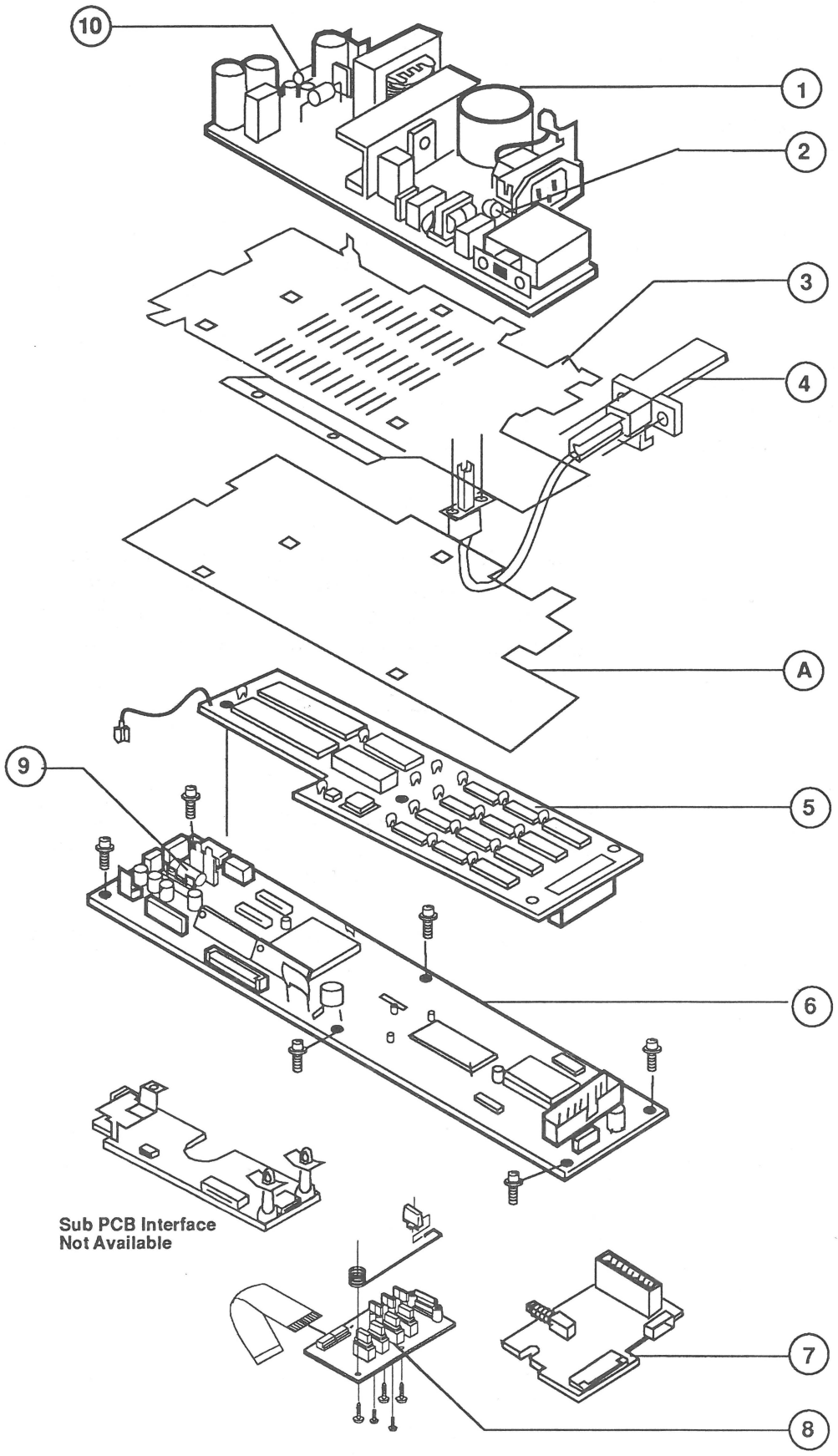

FIGURE 7

❑ IMAGEWRITER II/L PCBs (Figure 7)

Item	Part No.	Description
1	661-0582	Power Supply Board, 110/120V
2	941-5220	Fuse, 2A, 125V (5/pk)
3	949-0251	Ground Plate, Power Supply, 110/120V
	949-0263	Ground Plate Assembly, Power Supply, 220/240V
4	983-0018	Power-On Switch Actuator and Cable Assembly
5	661-0325	ImageWriter II/L LocalTalk Option Card
6	661-0581	ImageWriter II/L Main CPU PCB
7	982-0059	Print Head PCB
8	076-0367	Operation Panel, Platinum
9	941-5219	Fuse, 1.5A, 125V (5/pk)
10	941-5221	Fuse, 4A, 125V (5/pk)
	740-1104	Fuse, 4A, 250V (5/pk)

Note: The following screws, E-clips, etc., are used in the parts shown in Figure 7:

N-4
P-3 x 3
P-3 x 6
P-3 x 12
P-4 x 30
SMW-3 x 6
SMW-3 x 8
SMW-4 x 8
W-3.3
P-4 x 8

Note: The part shown as item A in Figure 7 is not available separately. It is part of the ground plate assembly for the 220/240V power supply.

A Mylar, Ground Plate, Power Supply, 220/240V

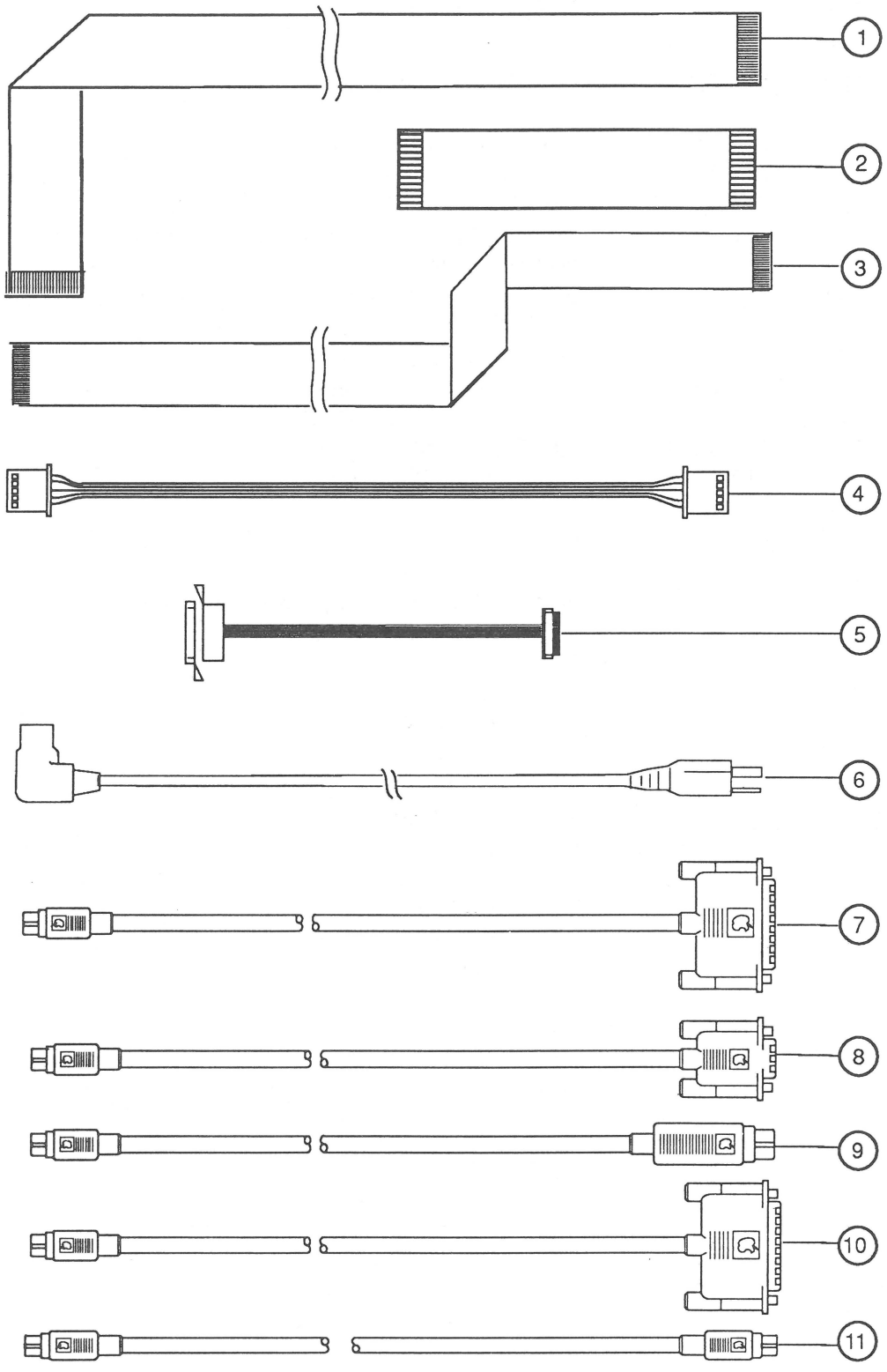

Figure 8

❑ CABLES (Figure 8)

Item	Part No.	Description
1	590-4551	Cable, Carriage Assembly PCB
2	590-4553	Cable, Operation Panel PCB
3	590-4550	Cable, Interface Card
4	590-4552	Cable, Power Supply to Main Logic Board
5	590-4555	Cable, Sheet Feeder, ImageWriter II
6	936-0029	Power Cord, 110V, Smoke
7	590-0555	Cable, APM/ImageWriter II/L to Apple III Plus, Apple III, Macintosh XL, Smoke
8	590-0551	Cable, APM/ImageWriter II to Macintosh, Smoke
9	590-0554	Cable, ImageWriter II to Apple IIc, Smoke
10	590-0556	Cable, ImageWriter II to Apple II, II Plus, IIe, Smoke
11	590-0552	Cable, APM/ImageWriter II to Apple IIGS, Macintosh Plus, Smoke

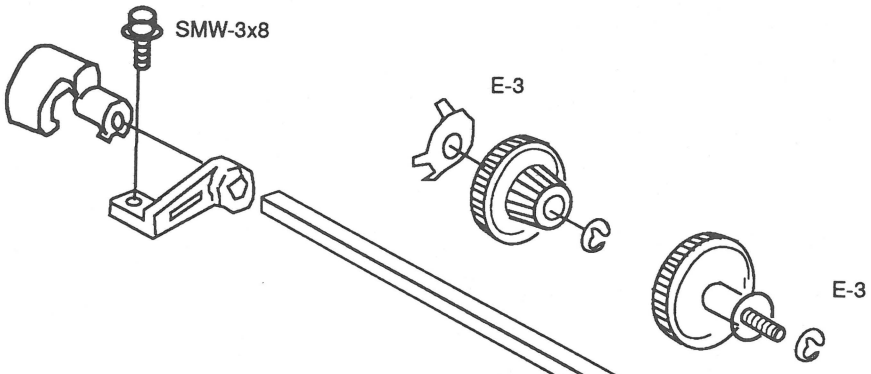

Figure 9

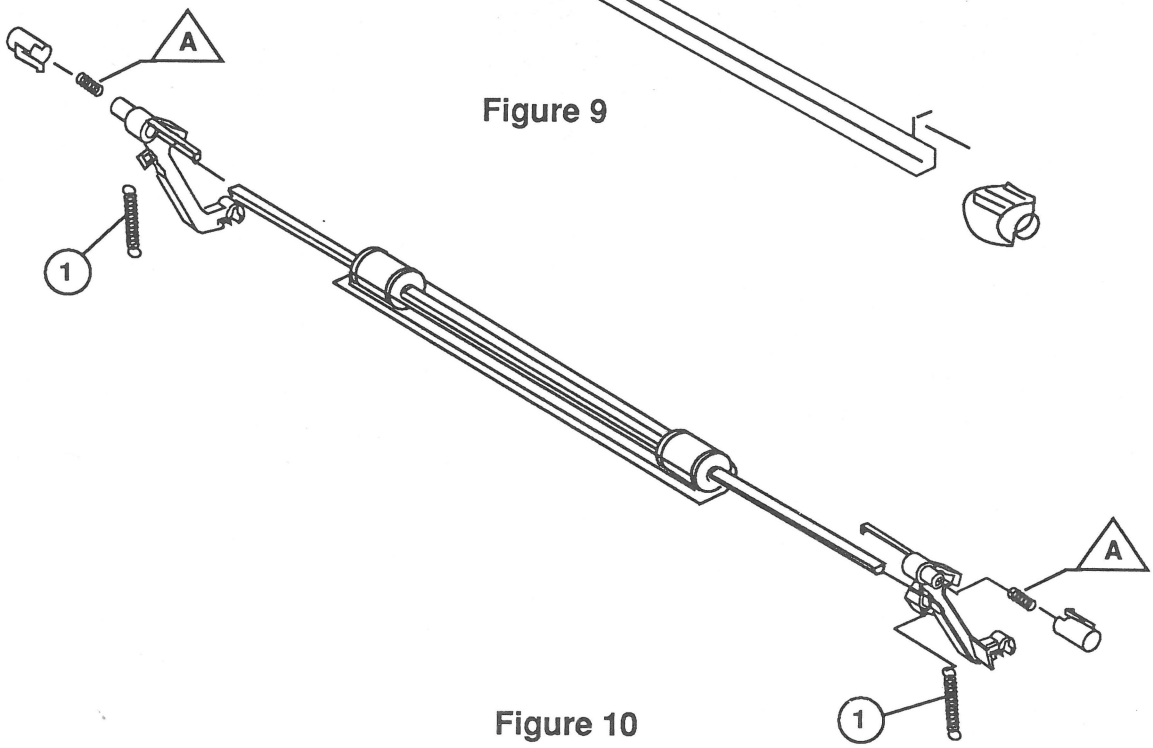

Figure 10

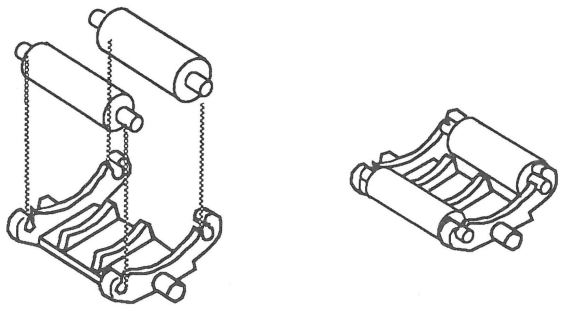

Figure 11

❑ SHIFT GEAR ASSEMBLY (Figure 9)

Item	Part No.	Description
–	076-0150	Shift Gear Assembly

❑ PAPER BAIL ASSEMBLY (Figure 10)

Item	Part No.	Description
–	076-0154	Paper Bail Assembly
1	957-0041	Spring, Bail Roller Arm (3/pk)

Note: The part shown as item A in this diagram is available as part of the Miscellaneous Hardware Kit. Refer to Miscellaneous Hardware Kit for further information. This part is not available separately.

A	Spring, Bail Roller Shaft (5/pk)

❑ PINCH ROLLER ASSEMBLY (Figure 11)

Item	Part No.	Description
–	076-0155	Pinch Roller Assembly

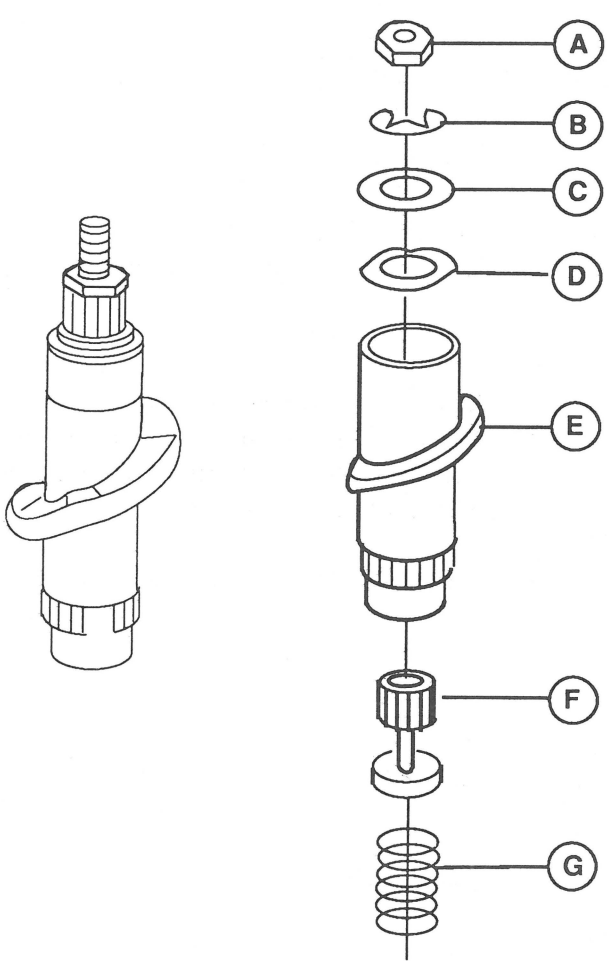

Figure 12

❑ COLOR RIBBON ASSEMBLY (Figure 12)

Item	Part No.	Description
–	076-0366	Color Ribbon Assembly

The Color Ribbon Assembly consists of the items listed below. They are not available for purchase separately, but are identified to assist you in assembling them. Instructions for assembly are located in Section 2, Take-Apart.

A	Locking Hex Nut
B	E-Clip, E-4
C	Shift Cam Washer
D	Wave Washer
E	Cam
F	Knurled Nut
G	Spring

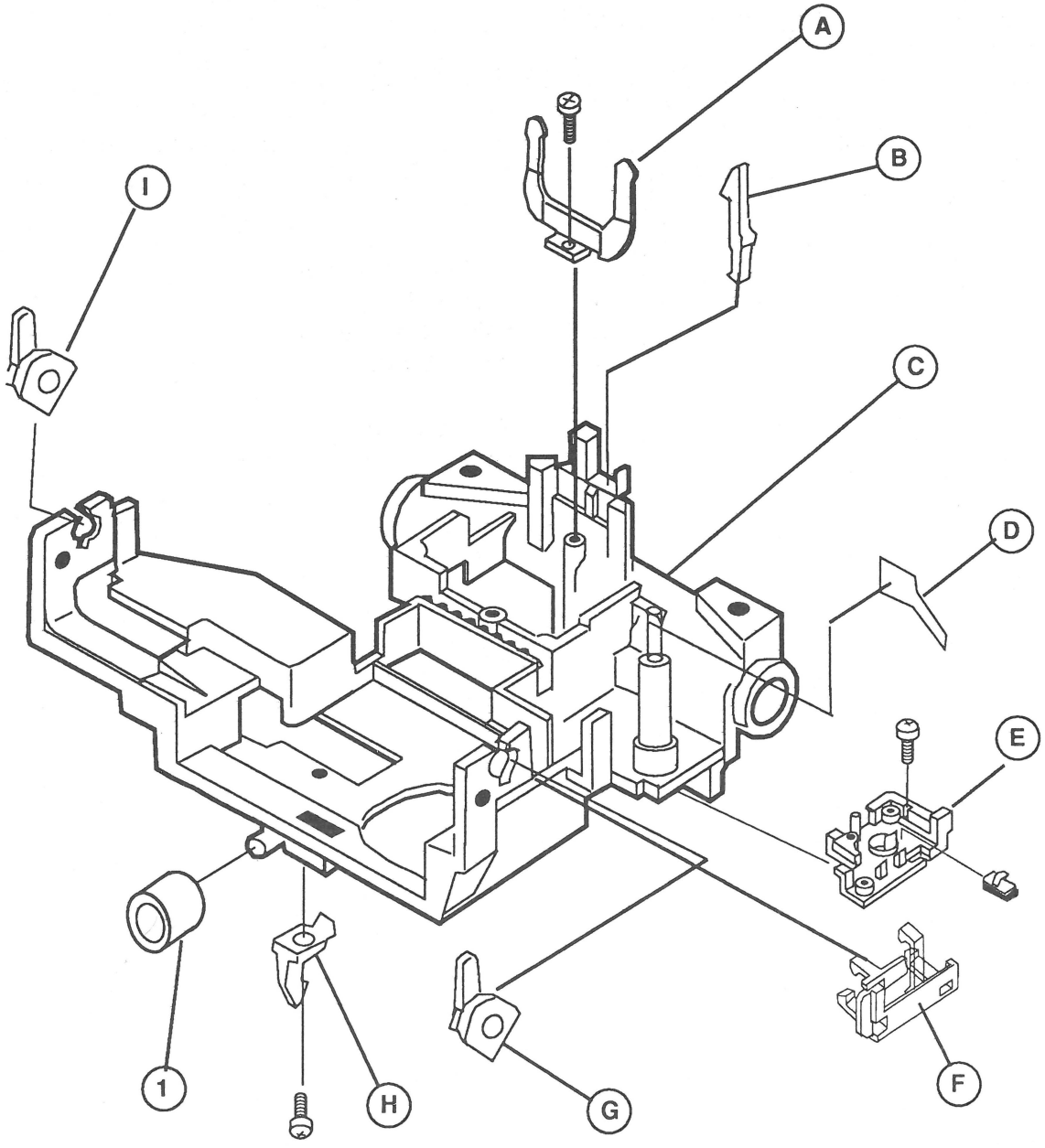

Figure 13

❑ CARRIER PARTS (Figure 13)

Item	Part No.	Description
–	076-0160	Carrier Parts
1	949-0129	Carrier Roller (10/pk)

The carrier parts are listed below. They are not available for purchase separately, but are identified to assist you in assembling them. Instructions for assembly are located in Section 2, Take-Apart.

A	Spring Head
B	Print Head Clamp
C	Carrier
D	Tab, Ribbon Shift Spring
E	Ribbon Kit
F	Lead Wire Guide
G	Bushing, Ribbon Frame, Right
H	Carrier Clamp
I	Bushing, Ribbon Frame, Left

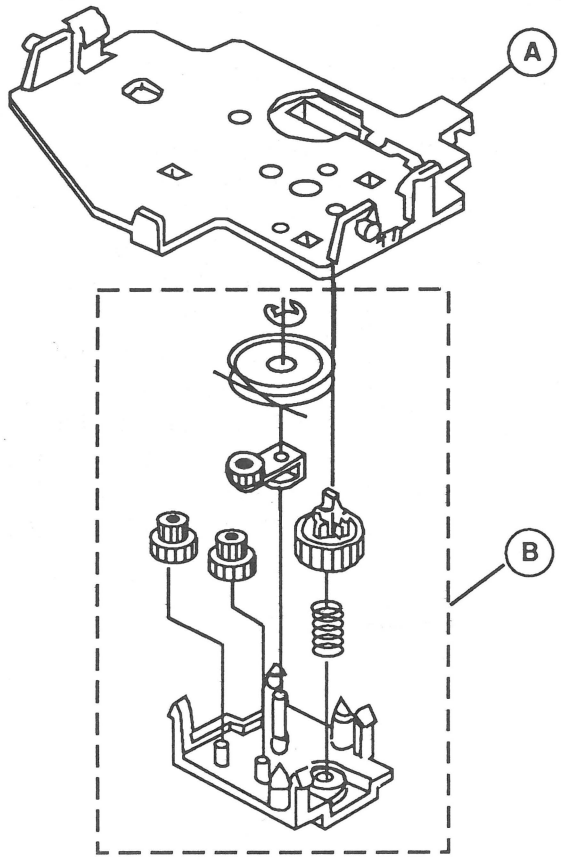

Figure 14

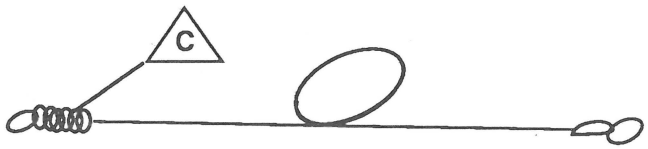

Figure 15

❑ RIBBON FRAME ASSEMBLY (Figure 14)

Item	Part No.	Description
–	076-0159	Ribbon Frame Assembly

The Ribbon Frame Assembly consists of the parts listed below. Items are not available for purchase separately, but are identified to assist you in assembling them. Instructions for assembly are in Section 2, Take-Apart.

A	Ribbon Plate
B	Ribbon Wire Assembly

❑ RIBBON WIRE AND SPRING (Figure 15)

Item	Part No.	Description
–	935-0001	Ribbon Wire and Spring

Note: The spring shown in this diagram is available as part of the Miscellaneous Hardware Kit. Refer to the Miscellaneous Hardware Kit for further information. These springs are not available separately.

C	Spring, Ribbon Wire (3/pk)

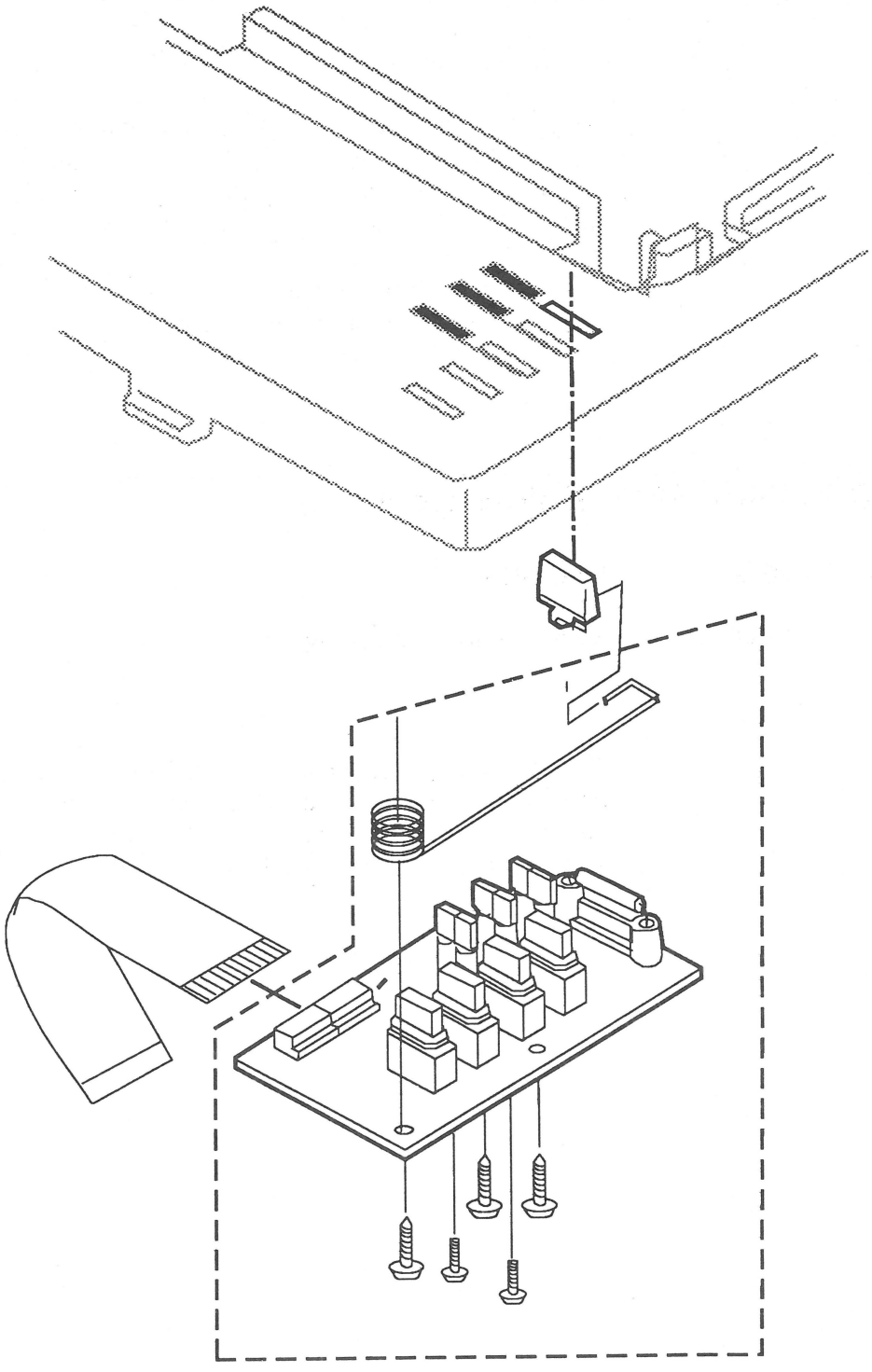

Figure 16

❑ OPERATION PANEL (FIGURE 16)

Item	Part No.	Description
–	076-0367	Operation Panel, Platinum

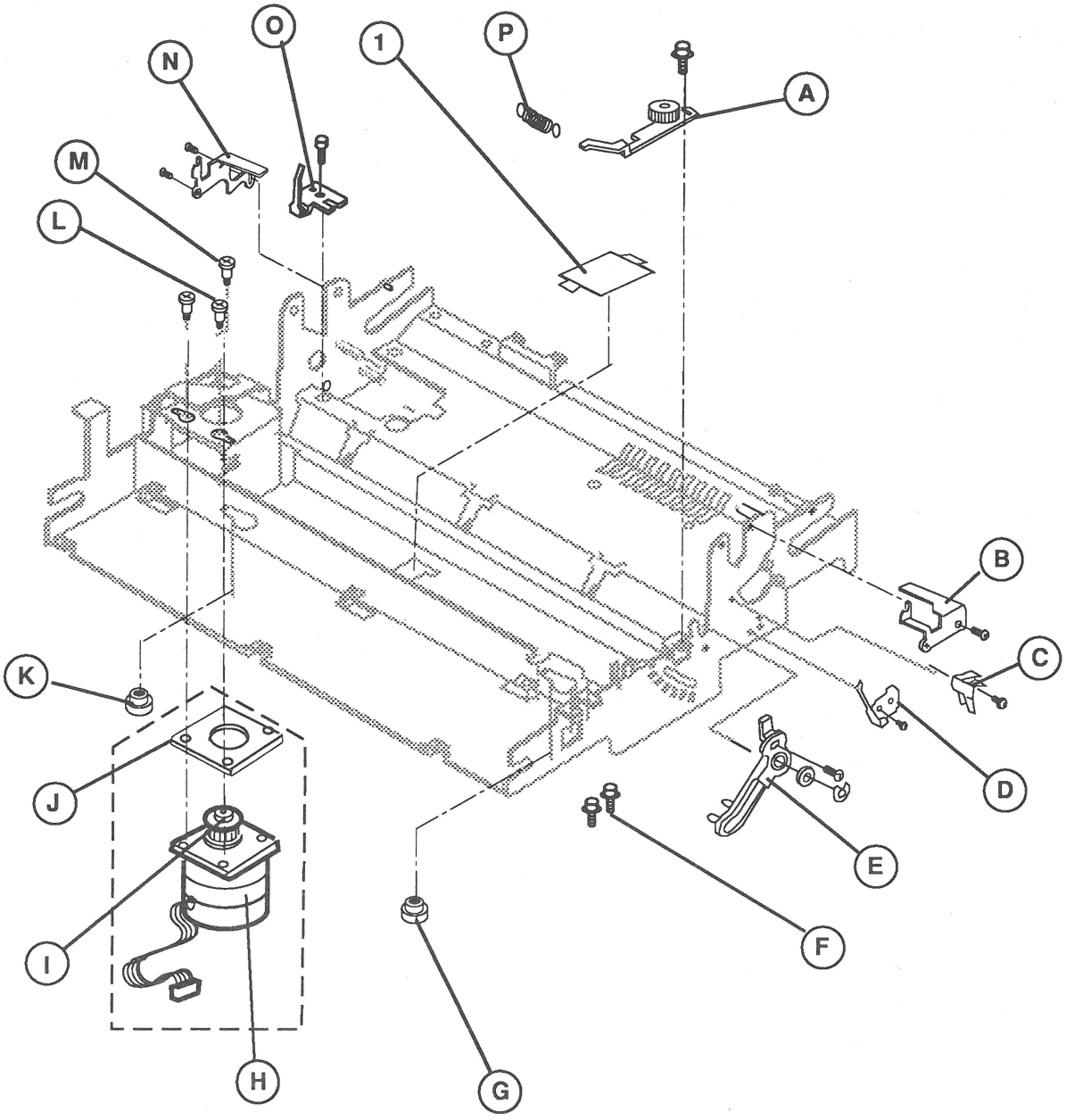

Figure 17

❑ FRAME PARTS (Figure 17)

Item	Part No.	Description
–	076-8376	Frame Parts
1	949-0254	Guide, Flex Cable

The Frame Parts consist of the items listed below. Items are not available for purchase separately, but are identified to assist you in assembling them.

A	Carrier Pulley Arm
B	Plate, Platen Bushing (Right)
C	Plate, Free Lever Spring
D	Plate, Carrier Shaft Spring (Right)
E	Impression Control Lever (A)
F	Screw, Power-On Cable Actuator (2/pk)
G	Grommet (A), Base Plate (3/pk)
K	Grommet (B), Base Plate (3/pk)
L	Screw, Carrier Motor Set (3/pk)
M	Screw, Base (3/pk)
N	Plate, Platen Bushing (Left)
O	Plate, Carrier Shaft Spring
P	Spring, Carrier Pulley Arm

–	652-0602	Carrier Motor Kit

The Carrier Motor Kit consist of the items below. Items are not available for purchase separately, but are identified to assist you in assembling them.

H	Carrier Motor
I	Pulley
J	Acoustic Damper

❑ QUICK REFERENCE—SCREWS (Figure 18)

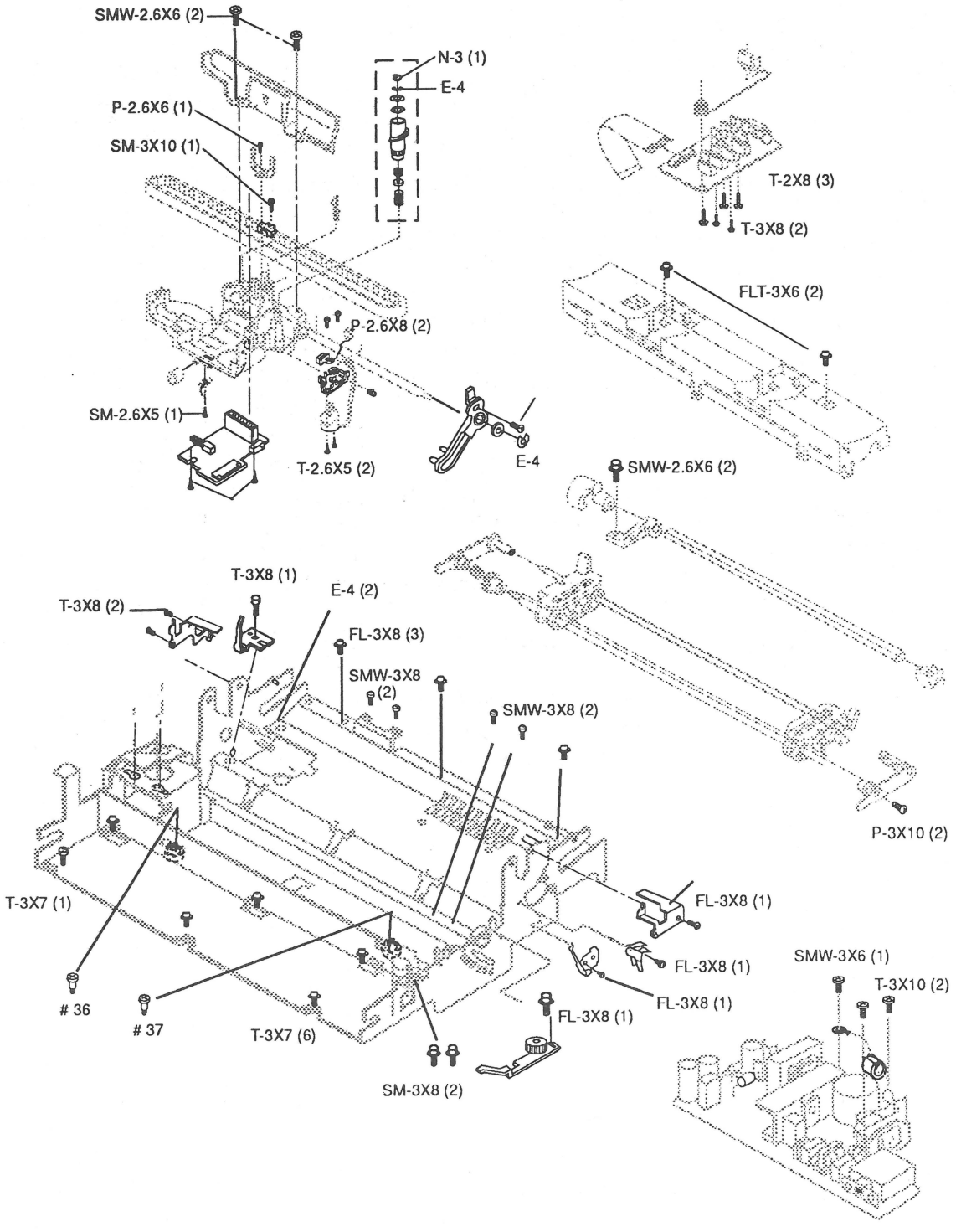

Figure 18

❑ MISCELLANEOUS HARDWARE KIT (No Associated Figure)

Item	Part No.	Description
–	076-0317	Miscellaneous Hardware Kit

Note: The Miscellaneous Hardware Kit is not pictured in this Illustrated Parts List. **The "Quick Reference Screws—Figure 18" at left is for reference only and is not associated with this page.** The Miscellaneous Hardware Kit contains some (but not all) of the screws shown in Figure 18.

Parts listed below are included in the Miscellaneous Hardware Kit. The quantities listed are included in the kit.

The parts listed below are not sold separately.

Description

Screw, Carrier Motor Set (3/pk)
Screw, Base Plate (3/pk)
Screw, Base (3/pk)
Screw, Head PCB (3/pk)
Screw, Access Cover, Beige (3/pk)
Screw, Access Cover, Platinum (3/pk)
Screw, Pan Head, 2.6 x 8 (3/pk)
Screw, Tapping, 2.6 x 5 (3/pk)
Plate, Pinch Roller Spring (3/pk)
Bushing, Ribbon Frame, Right (3/pk)
Bushing, Ribbon Frame, Left (3/pk)
Rubber Printer Cushion (3/pk)
Stopper Access (3/pk)
Spring, Bail Roller Shaft (5/pk)
Spring, Ribbon Wire (3/pk)
Spring, Pin, D2 x 16 (3/pk)
Spring, Deflector (3/pk)
Grommet (A), Base Plate (3/pk)
Grommet (B), Base Plate (3/pk)